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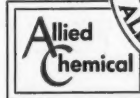
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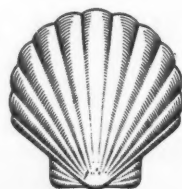
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FARM CHEMICALS

## In this issue . . .

**With two thirds of NAC's** spring convention program closed to the press, coverage of the meeting is necessarily limited. Of special note are the remarks of John C. White, Texas commissioner of agriculture who announced a new 2,4-D use restriction. Story and photos, beginning on page 22.

**A new Tacoma, Wash. fertilizer** plant has been placed in operation by Carstens Packing Co. The push button set-up has helped to increase production capacity to 120 tons per day. For a description and pictures, see page 30.

**The Canadian Agricultural Chemicals Association** has completed a most successful first annual meeting. Excellent speakers helped develop the theme, "More Effective Pest Control Through Co-operation." Begins on page 33.

**According to Harold Hartogensis**, the broad spectrum herbicides developed by Thompson Chemicals Co. will control just about anything in the way of woody growth. One feature of this line, as described in the article on page 37, is a simplified application technique.

**Farm Chemicals is pleased to present**, beginning on page 39, the talk presented by Paul T. Truitt, APFC head, at the recent Midwest meeting of agronomists and industry reps. He includes a comprehensive review of fertilizer production facilities and forecasts a bright, if not easy, future for the industry.

**Nearly 500 persons were present to hear** the remarks of top flight agronomy and fertilizer authorities at the Midwest meeting. A round-up story and photos prepared by Z. H. Beers, executive secretary, Middle West Soil Improvement Committee, begins on page 43.

Two of these papers, those by Truitt and K. C. Berger, are included in this issue. A third, by H. E. Myers, on "What Does the Future Hold for the Fertilizer Industry" will be included in the May issue of FARM CHEMICALS.

**A number of small package formulators** already have placed malathion products on the market for home garden use. Information on garden applications of this versatile insecticide and some notes on formulation appear on page 51. Malathion is also proving an excellent material for fly control, as described on page 53.

**According to Vernon Gornto**, the Fertilizer section of National Safety Council has made rapid strides during the few years of its existence. For a short report on the progress, aims and needs of this group, turn to page 55.

APRIL, 1954

## Farm Chemicals

Pioneer Journal  
of the Farm Chemicals Industry  
Established 1894

Vol. 117

APRIL, 1954

No. 4

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### Cover Story

One of the first steps in producing farm fungicides at Tennessee Copper Co. is mining of sulphide ores. This company is unique in that it has control of all production stages from mining to shipment of the end product.

A magazine national in scope and circulation and devoted to manufacturers, mixers, and formulators of fertilizers and pesticides



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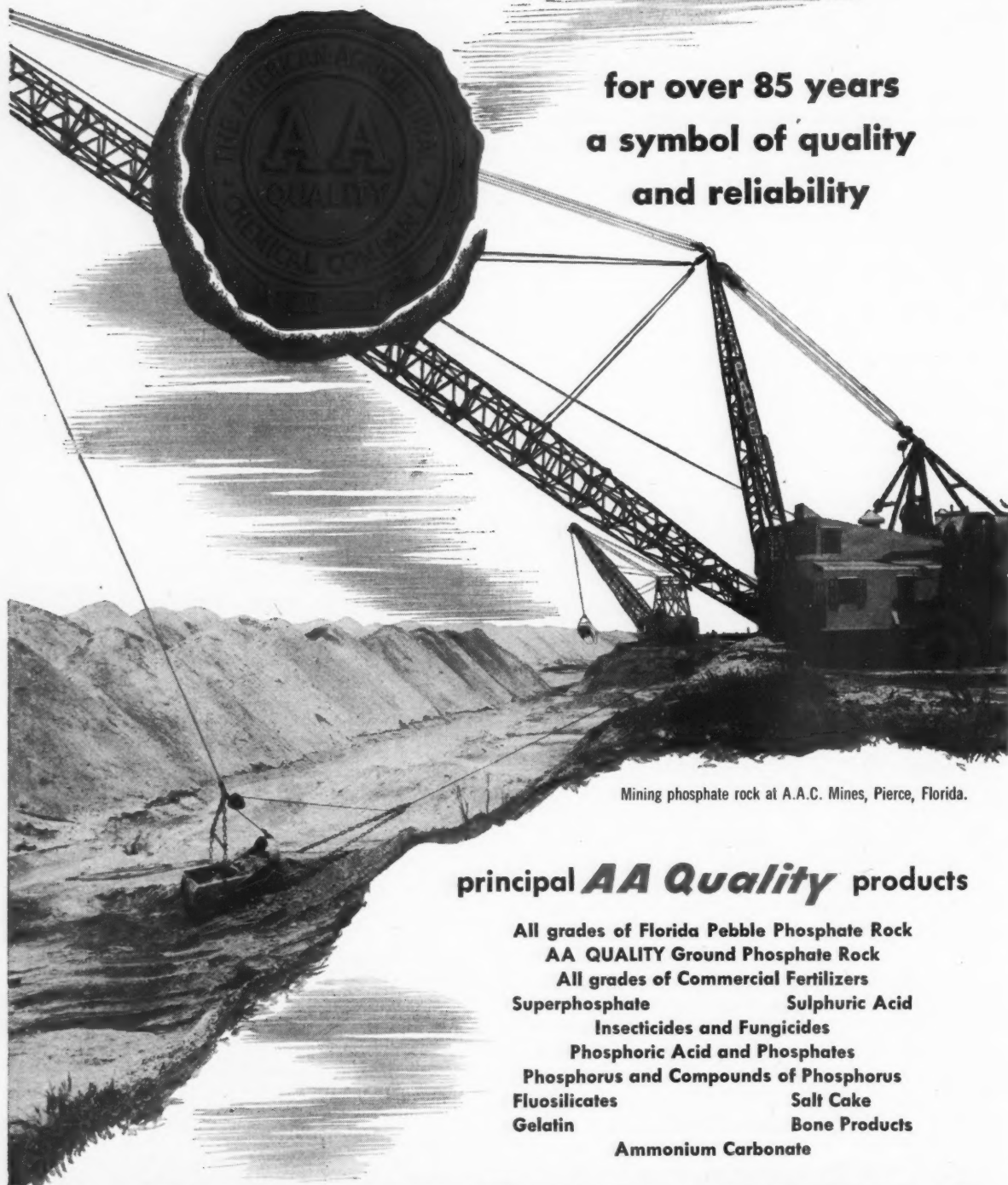
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FARM CHEMICALS

# **Washington Report**

**By Fred Bailey & John Harms**

**Now that the government's recently established nitrogen productive capacity goal has been proven obsolete . . .** further government-industry meetings will be held to work up a realistic program to meet emergency needs. R. L. Hockley, Mathieson executive, requested re-opening of discussions in behalf of the Nitrogen Industry Conference Task Force.

**A Commerce department survey,** conducted at the suggestion of the Task Force, showed the government goal . . . set in February . . . was 10 per cent below what the industry actually could produce by 1957. Nitrogen producers indicated that under emergency conditions they could produce over 3.8 million short tons, including by-product nitrogen, organic waste and projects certified under the nitrates program. The government goal was 3.5 million tons by 1957.

**Tighter yardstick for handing out tax amortization certificates is indicated . . .** and talked by officials. Among other criteria, more consideration is expected to be given to geographic need.

**Pesticide tolerance legislation now looks like a shoo-in to congressional insiders.** One sign of this generally confident attitude was the bare attendance of interested parties to recent hearings on the Miller bill before the House Interstate Committee. It now seems almost a foregone conclusion that the bill will be approved by Congress . . . just as it was a foregone conclusion that the Interstate Committee would unanimously report the bill out, as it did.

**Republican congressional leaders have given assurance that the measure will be brought to a vote sometime in April.** Rep. A. L. Miller of Nebraska, sponsor, predicts that the House will vote overwhelmingly for the bill.

**Miller's proposal to set up tolerances for chemicals used in processed foods now is not expected to be ready for the present Congress.** Miller plans meetings with interested groups on the proposed bill, but is dubious a draft can be ready before Congress adjourns this summer.

**Farmers are expected to buy more pesticides this year than they did in 1953.**

Growing threat of some insects points to more preventive spraying in addition to spraying and dusting during growth season, according to USDA forecasts. Bugs that may be worse this year include: Boll weevil, corn borer, grasshoppers, Mormon crickets and chinch bug. Restrictions on amount of acres farmers can use for important crops, like cotton, are officially not expected to cut demand for pesticides. But, of course, weather may.

**Stocks of pesticides** carried over from the 1953 season are considerably smaller than the large stocks of a year ago. Much of this reduction, Agriculture officials say, is due to smaller stocks of DDT and some other chlorinated synthetic insecticides. Carryover of benzene hexachloride is about 35 per cent larger than a year ago.

**Manufacturers' prices of pesticides** reportedly are slightly higher than last fall. But since some makers are paying part of the shipping costs, much of the increase is not felt by farmers. Slightly higher prices "reflect the return to more normal stocks."

**Study by the department shows that annual expenditures for pesticides vary quite a bit** from year to year and from type of farm to type of farm.

For example: In 1953, expenditures on family-operated cotton farms in southern

Piedmont area averaged about \$55 per farm. In 1951, these pesticides would have cost nearly twice as much. However, these farmers spent around \$80 for pesticides in 1951, as the quantities used were about a fifth less than in 1953. Expenditures in 1952 averaged about \$40 per farm. These farms averaged 53 acres of crops harvested in 1953 of which 16 were cotton.

**On some types of farms expenditures for insecticides** are negligible. Annual spending for weed control materials on wheat-small grain-livestock farms in the northern plain averaged about \$20 per farm in each of the last few years. These farms are much larger than Piedmont cotton farms.

**Should farmers use less fertilizer on crops such as cotton and corn under acre restrictions?** Agriculture department policy men say no, but surplus-conscious economists are suggesting it.

**A recent USDA economic report on the farm cost outlook warns farmers:** "Use of fertilizer can intensify the problems of an already unbalanced agriculture, or it can aid in bringing it into better balance . . . The way the farmer uses fertilizer on all his land, including diverted acres, can greatly influence the success of the adjustment program in general, and the success of the individual farmer in making needed changes on his own farm."

**The official Government report concludes:** ". . . For crops under control programs, application of fertilizer at most profitable rates for the individual farmer may in the short run tend to accentuate the surplus problem. Eventually the burden of this problem must be shared by the individual farmer."

**This is not a major shift in department policy, top-echelon policy-makers assured us.** Emphasis still is on efficient farming—most efficient use of plant foods, we are told. If this is so, it indicates merely that the "left hand doesn't know what the right hand is doing." Actually, there is some concern in fertilizer circles here that zealous county agents and extension economists may pick up what looks like the new "line" and educate farmers to it.

**The move to hitch up price supports with conservation is picking up steam.** USDA, major farm organizations and prominent lawmakers now are pushing for the idea.

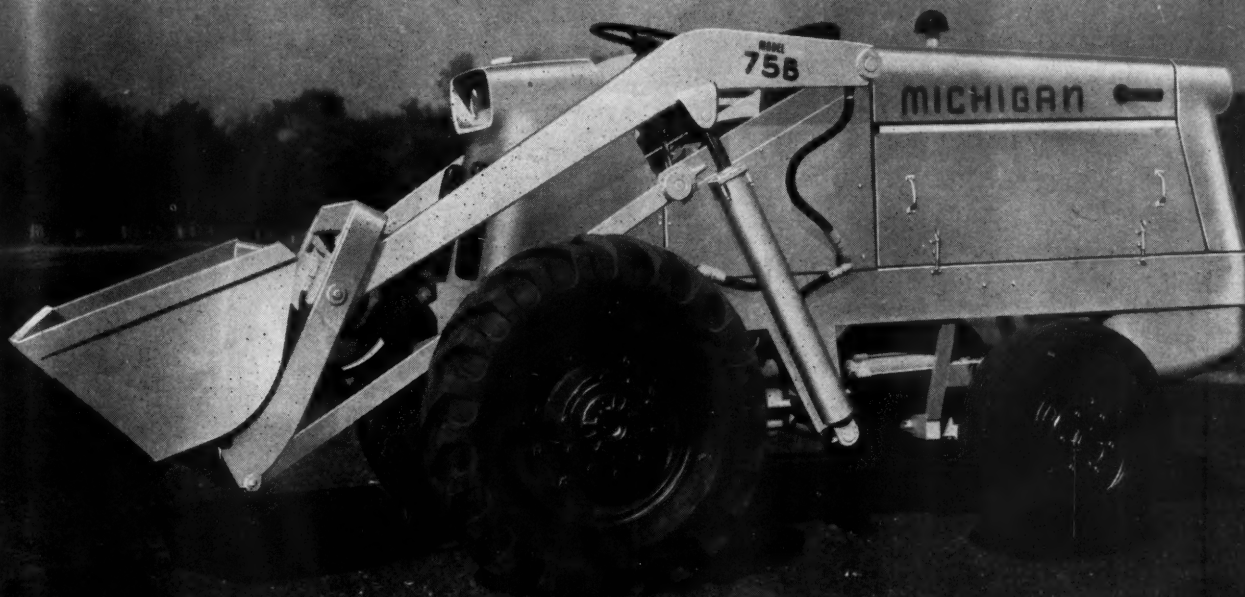
**Farm Bureau wants both ACP payments and price support** (for crops not under quotas) to be withheld—unless farmers "devote a percentage of their cropland to soil-building crops or practices." Grange asks speedy finish of SCS classification of U.S. land capability—in order "to establish a sound relationship between wise land use and the benefits of a price support program."

**"Some of our present acreage," Benson tells Congress,** "should be shifted out of crops and into sod." The secretary also asks power to withhold price support unless acres taken out of controlled crops are used so as to help the land. Bills being backed by lawmakers in both houses ask special payments to farmers who put diverted acres to conservation uses.

**Full-dress congressional hearings on the Administration's farm plan** developed almost solid farm state opposition to flexible price supports. Opposition to the program was typified by the fact that not one prominent farm state representative in the House Agriculture Committee would sponsor the program on the floor. As we went to press, Ike's farm program still had not been introduced in the House. In the Senate, it was somewhat different. Sen. Aiken of Vermont sponsored the bill, but there was a question whether the Agriculture Committee would approve it for a Senate vote.

**Strategy of high, fixed price prop advocates was to tack extension of rigid 90 per cent support** onto the Administration wool bill if it comes up ahead of the omnibus farm bill. Thinking was that Ike wouldn't be inclined to veto the wool bill—which provides direct payments to growers and which he recommended—just to kill off rigid supports. If this strategy fails, the farm bloc is confident it can ram through continued high supports over a Presidential veto.

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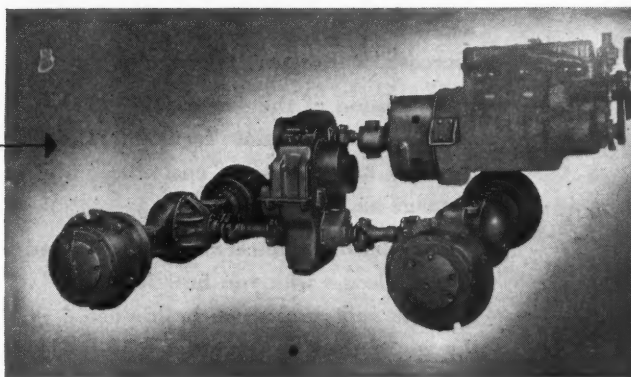
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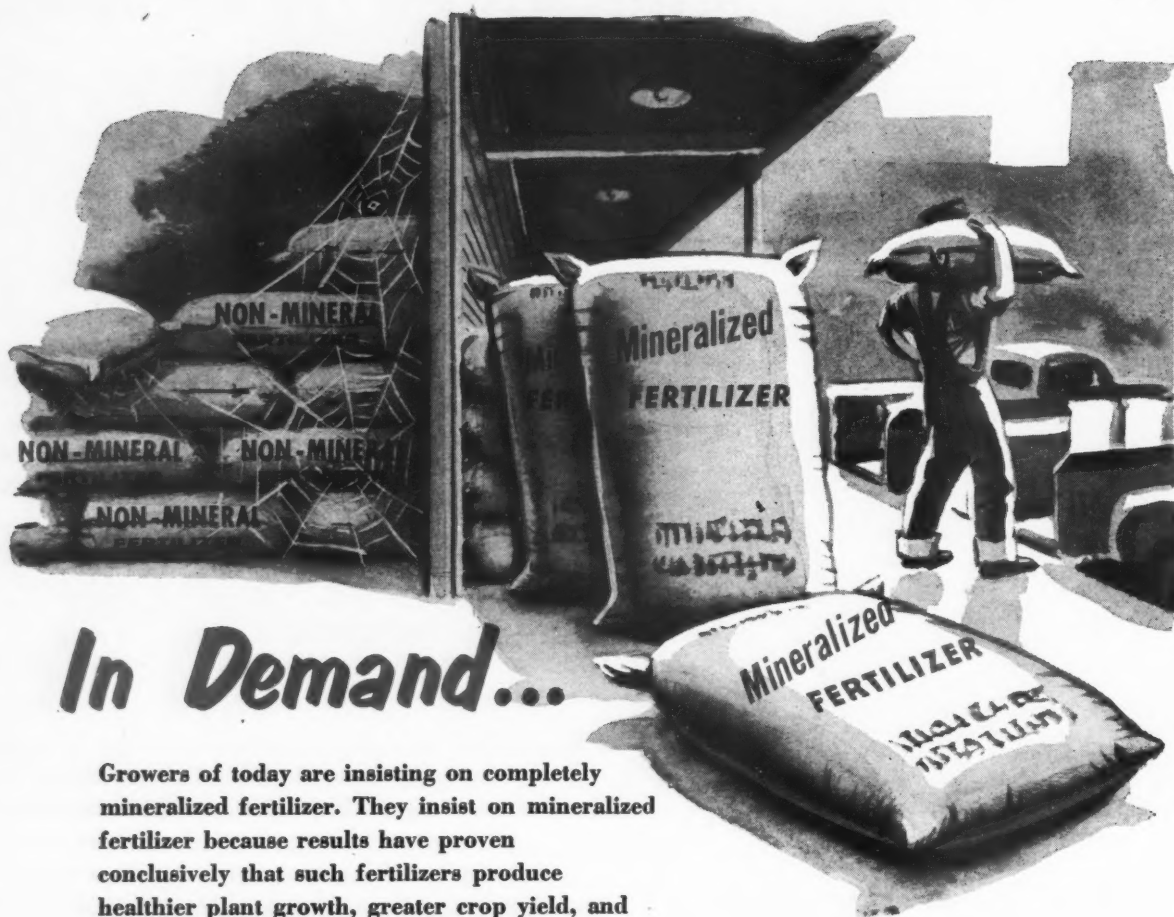
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# Industrial News

NEW PRODUCTS

STATISTICS

PEOPLE

MEETINGS

COMPANY BRIEFS

EQUIPMENT

## Final Work Underway at Deere Plant

**F**INAL construction is underway on the Grand River Chemical division of Deere & Co.'s \$20 million nitrogen plant located near Pryor, Okla. Anhydrous ammonia production is expected in June and urea production at a later date.

L. A. Rowland, who is vice president, Deere & Co., and general manager of the Grand River unit, announced that the company's entry into the chemical field was strictly an adjunct to its traditional farm equipment business providing an opportunity to further serve the farmers' needs and indirectly help build for a more stable national economy.

It is believed that the unit is of the most modern design in the world. Among the outstanding features are compactness and automatic control, thus reducing the normal labor requirement. A new gas oxidation and Casale synthesis process will be employed to produce ammonia, while the Pechiney process will be used to produce urea.

The plant has a rated daily capacity of 180 tons of anhydrous ammonia. The majority of the ammonia will be used to produce urea leaving the remainder to be shipped as anhydrous ammonia.

Center: L. A. Rowland, vice pres., Deere & Co. and gen. mgr. of Grand River Chemical Division; left: W. W. Yeandle, works manager, and right: J. R. Taylor, Jr., sales manager.

New nitrogen plant of the division under construction near Pryor, Okla.

Fertilizer grade urea will be marketed under the registered trade name "Vitrea," and will be guaranteed 45 per cent nitrogen. For easy drilling and improved physical properties, the "Vitrea" will be prilled and coated with a special conditioner.

The Grand River Dam Authority will supply the plant's daily requirement of 2,300,000 gallons of water, 125,000 pounds per hour of steam and the power load of 15,000 k.w. The Oklahoma Natural Gas Co. will deliver about six million cubic feet of gas per day—equal in approximate consumption to a city the size of Enid, Okla., which has a population of over 36,000. The plant is served by the Missouri-Kansas-Texas Railroad.

A modern two-story administration and research building has recently been completed at the plant site, four miles southeast of Pryor, and is now occupied by plant personnel. The general and sales offices have been permanently located at 2010 S. Utica, Tulsa, Okla.



## Production Begins at Consolidated M & S Plant

Production has begun at the Kimberley, B. C., ammonium phosphate plant of Consolidated Mining and Smelting Co. of Canada, Ltd.

At a cost of more than \$17,000,000, the productive capacity for Cominco's Elephant Brand fertilizers has been increased

by more than 150,000 tons and the 1954 output will total 700,000 tons of high analysis fertilizer materials, according to the company.

This large increase in production has been made possible, the Canadian manufacturer states, not only by the building of the Kimberley plant, but also by expansion and modernization of fertilizer plants at Trail, B. C., and Calgary, Alberta.

## Diamond Fert. Leases

### Buckeye Sugar Plant

Diamond Fertilizer Co., Sandusky, O., has announced a \$150,000 expansion program which will lift production from 12,000 tons to 24-25,000 tons.

It is leasing Buckeye Sugar Co.'s fertilizer plant in Ottawa, O. The plant will operate as Diamond-Ottawa Agricultural Chemical Co., handling products of both concerns. Expansion of warehouse facilities at Ottawa is expected to begin at once, and improvement of plant equipment will commence this summer, according to Howard Morgan, Diamond vice president.

## Atlas Powder Begins

### Two Esterification Units

Construction of two esterification plants, at Memphis, Tenn. and Brantford, Ont., has been started by Atlas Powder Co. The plants will expand the company's production of emulsifiers and other surface active agents for the insecticide industry.

The plant at Memphis, larger of the two, will cost more than \$1,000,000 and is scheduled for completion by late 1954, according to Atlas.

The Canadian plant is being erected by Atlas Powder Co., Canada, Ltd. Its first unit, to cost about \$350,000, will be in operation within six months. Preliminary planning has begun on possible addition of a second unit for production of ethylene oxide derivatives at this location.

## Rydell Heads Coronet Div.

Smith-Douglass Co., Inc.'s Coronet Phosphate division offices will be moved from New York City to Norfolk on or about April 1. Simultaneously Rudolph S. Rydell will assume the duties of president of Coronet division.

He had formerly been associated with Swift & Co. for 17 years, during the past five years as manager of the Raw Materials division. Rydell succeeds John R. Sheffield, of New York City.

## Chloro-IPC Film

Proper weed control procedures in cotton with Chloro-IPC is depicted in a 16-mm sound and color motion picture film produced by Columbia-Southern Chemical Corp.

Titled "Weed Control in Cotton with Chloro-IPC," it tells the story of progressive cotton farming in addition to presenting a step-by-step guide for proper use of the herbicide under great variations in weather and soil conditions.

The seventh and final link in its chain of South Atlantic and Gulf Coast facilities for pier side storage and packing of Nitrolime fertilizer has been established by Bradley and Baker, New York City.

Operation of the latest facility in the port of Charleston, S. C., was initiated with the arrival of more than a half-million dollars worth of Nitrolime from Holland, via the steamer, Ardea. Previously established facilities are located in Norfolk, Va.; Wilmington, N. C.; Savannah, Ga.; Pensacola, Fla.; Mobile, Ala. and Gulfport, Miss.

After unloading, a series of conveyor belts transported the fertilizer to a large storage area in the warehouse, and from there to a battery of packing machines. The full bags were loaded into waiting railroad cars on the pier siding for dispatch to fertilizer manufacturers and dealers serviced by the Charleston operation.

Considered far superior to the previous manner of shipping the material from Holland already packed, this new method of sacking after arrival eliminates former problems such as contamination of bags and caking during ocean shipment. Richard R. Mehrhof of Jacksonville, Fla., a Bradley and Baker representative, stated "we feel this method of packaging after arrival will insure the farmer against receiving poorly conditioned material, and also will cut down on unit damage in transit."

The initial Charleston cargo produced between 200,000 and 220,000 100-pound bags of Nitrolime, with a current wholesale market value of \$51.25 per ton at Charleston.

An inspection tour of the entire installation was sponsored by Bradley and Baker for members of the fertilizer industry, representatives of various Charleston port interests and the press, followed by a reception and dinner at the Frances Marion Hotel.

### **Stauffer Adds Mexico Plant**

Stauffer Chemical Co. recently announced the addition of a second insecticide dust manufacturing plant by its Mexican subsidiary, Stauffer de Mexico, S. A. It is located at Rio Bravo, Tamaulipas.

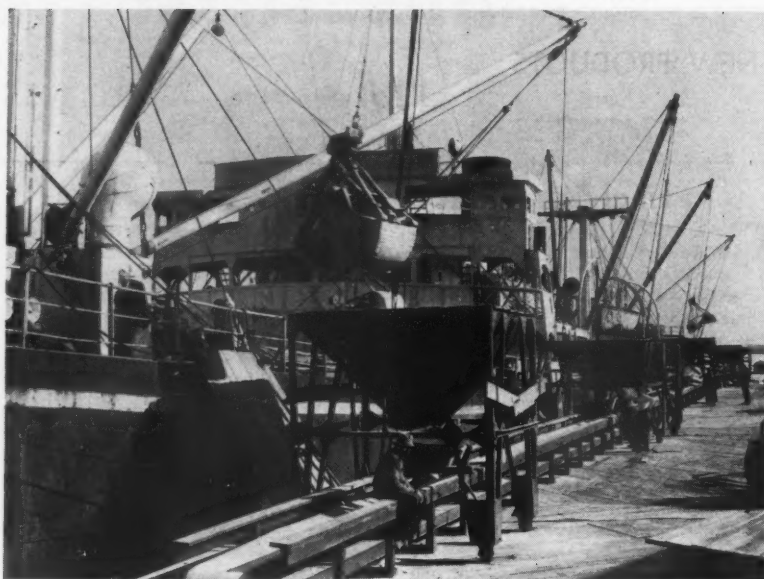
For more than a year, the subsidiary has been operating a plant at Nogales, Sonora, serving Western Mexico.

Technical service is being carried on by a staff of trained entomologists under the direction of Carlos M. Gonzalez. Sales of materials for Eastern Mexico from the Rio Bravo plant will be under the supervision of Roy S. David, territorial sales manager.

### **Sulfuric Acid Study**

A sulfuric acid distribution study by the Business and Defense Services Administration shows that 1952 consumption continued at the level established in 1951. Gross consumption totaled 14,644,000 tons and net, 12,075,000 tons. Production of phosphatic fertilizers accounted for 4,053,000 tons and represented the biggest single use.

## **New Bradley & Baker Port Facilities**



Recently established Charleston port facilities of Bradley and Baker.

Acid for this purpose rose from 1950 through 1952 averaging about one-third of net consumption during the period. A greater utilization of spent acid made possible the continued increase, according to the report.

Insecticide production ranked in second place but was far behind the fertilizers with 14,220,000 gross tons.

From 1950 to 1951 gross consumption was shown to have increased nearly five per cent reflecting mostly greater use of spent acid. Net consumption, however, increased only two per cent, a figure attributed to sulfur conservation measures.

The report showed Jan. 1, 1953 production capacity at 14,561,000 tons compared to 14,220,000 in 1952 and 13,413,000 at the beginning of 1951. From the first of 1950 to Jan. 1, 1953, a 10 per cent gain in production capacity was registered.

### **Attapulugus & Edgar Bro.**

#### **Announce Merger Plan**

Announcement has been made by Wright W. Gary, president, Attapulugus Minerals & Chemical Corp., and James Deshler, president, Edgar Brothers Co., that a basis of merger of the two companies had been agreed upon, subject to ratification by directors and stockholders. The merged company would be known as American Minerals & Chemicals Corp.

Gary will be president of the new company and Deshler will be chairman. David E. Lilienthal, now chairman of Attapulugus, will become chairman of the executive committee and the research policy committee; Alfred G. Blake will be executive vice president; R. H. Hubbell, Jr., vice president; Charles W. Nielson, treasurer and W. E. Sawyer, Jr., secretary.

The Attapulugus and Edgar Brothers businesses will retain their identities and will be operated as separate divisions of

American Minerals & Chemicals Corp. By combining the research activities of the two organizations, it is believed that new mineral and chemical products, not now produced by either Attapulugus or Edgar Brothers, can be developed and marketed.

It is believed that, under the new arrangement, the organizations will operate as the Attaclay and the Edgar Bros. divisions.

### **Meetings Scheduled On Nitrogen Capacity**

Another meeting for discussion of nitrogen industry capacity was proposed in telegrams sent by the Department of Commerce to R. L. Hockley, Mathieson Chem. Corp.; Dr. L. E. Lloyd, Dow Chem. Co.; T. R. Cabbage, Phillips Chem. Co. and J. R. Riley, Spencer Chem. Co.

A survey conducted by the department has shown that present facilities and those under construction are capable of producing more nitrogen than was called for by the 3.5 million ton 1957 expansion goal announced in February.

Results upheld the opinion of nitrogen producers who had previously stated that present facilities were sufficient to handle increased requirements. Figures released show the total domestic nitrogen supply from existing plants and those under construction to be 3,604,100 tons. Projects already awarded certificates of necessity but not yet under construction add another 230,100 tons for a total potential supply of 3,834,200 tons by 1957.

Ability to achieve maximum production was confirmed, according to the report, "by company data showing plant operations at five to 18 per cent above rated capacities during various periods of the past two years."

## Tilghman Building New Fertilizer Plant

Wm. B. Tilghman Co. has announced its plans to construct a fertilizer plant at Pocomoke City, Md. Automatic electric equipment will be featured with fire resistant construction of steel and concrete.

Basic materials brought in by either water or rail will be delivered to a receiving elevator and there be raised into the building by chain bucket elevators, moving on a horizontal belt conveyor to storage bins.

After screening and mixing, a bucket elevator takes the mix to a horizontal belt conveyor which drops it into large bins for curing. Fertilizers are again screened before bagging in automatic machines.

Ralph A. Ross, vice president and manager of the Pocomoke City plant, said that a large warehouse, which will be part of the new factory, has already been constructed. Farmers can obtain from this warehouse fertilizers made in the Salisbury plant and a complete line of lime, insecticides and fungicides which are stocked there.

The new plant soon will be under construction and is expected to be completed in the fall.

## Coast Guard Relaxes Restrictions on Nitrates

Restrictions have been relaxed on the use of waterfront facilities for the loading or unloading of ammonium nitrate, the Coast Guard recently announced. The move is designed to meet the problem of heavy shipments from abroad being threatened with delay because of inadequate port facilities.

If handling is in accordance with Coast Guard regulations for explosive or other dangerous articles on board vessels, the new rules state that these mixtures now may be handled at any pier.

## Woods Expresses Confidence

American business has every reason to face the future with confidence, stated J. Albert Woods, president of Commercial Solvents Corp. in a talk before the Rotary Club of Terre Haute, Ind.

"What American business faces in 1954 is no more than an adjustment to a new set of conditions brought on by the cessation of Korean hostilities, reduced defense expenditures and post-war demand and supply becoming balanced in a number of business fields."

## Post Office Revises Aerosol Mailing Rules

The Post Office Department has approved the mailing of certain pressurized packages previously refused the use of the mails, according to an announcement from the Chemical Specialties Manufacturers Association.

CSMA, however, stressed the importance of observing all regulations for such

APRIL, 1954

products, suggesting that every shipper be overcautious and, if need be, even go beyond the requirements.

Shippers were asked to be certain that all valves are protected; strong, well constructed outside containers be used; suitable absorbent material be included as required or indicated by good judgment; packages be labeled completely and that all aerosol packages be able to pass the water bath test at 130 degrees F.

## Industry Urges New Korean Fert. Policy

The government has been urged by representatives of the fertilizer producing industry advisory committee to modify its policy governing purchases of fertilizer for Korea to enable domestic industry to compete with foreign manufacturers in filling Korean requirements.

Following the Feb. 25 meeting, it was stated that no conclusions had been reached on how to meet the problem, but that the officials would give further study to the matter.

## 'Nickels' Contributions

Since its inauguration on Jan. 1, 1952 until the third quarter of 1953, the "Nickels for Know-How" program in North Carolina has brought in \$253,627.67. Five cents per ton is contributed by farmers through manufacturers of fertilizers and feeds.

## New Spreader Tested On Steep Tenn. Slopes

A device which will give even spread of "wet" limestone and fertilizers, developed by agricultural engineers of Tennessee Experiment Station and Tennessee Valley Authority, is pictured on a field with approximately 45 per cent slope. Mounted on the front of crawler tractor, the equipment can be used "up, down or around" fields with as much as 60 to 70 per cent slope.



It was built, according to the experiment station, because of a need which is evident on thousands of acres of steep land within the Tennessee valley.

Presently under test at the station, the spreader shows promise of adequately handling ground limestone ranging from dry to 12 per cent moisture content.

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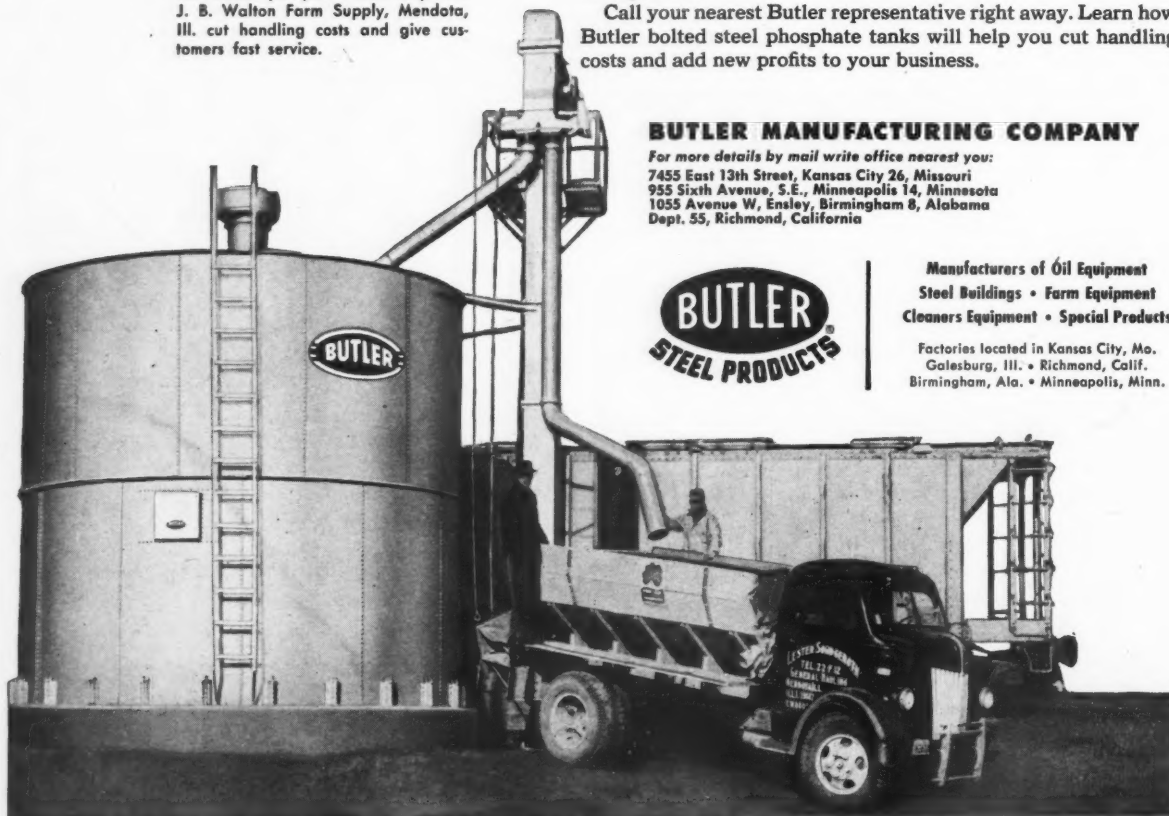
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516 East 29th Street, North Kansas City, Mo.  
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**BUTLER MANUFACTURING COMPANY**

APRIL, 1954

## Pesticide Carryover Below 1952 Levels

USDA has announced that pesticide carryover from 1953 is well below that of a year ago. Primary reduction was reported in stocks of DDT and some other chlorinated synthetics although BHC stocks are about 35 per cent larger than a year ago.

Although manufacturers' prices are slightly higher than last fall the fact that some producers now pay part of the shipping cost offsets some of the price increase according to the statement. Prices quoted on DDT and BHC average better than one-fifth higher than in the fall.

Domestic consumption this year may be somewhat higher although USDA points out the influence of natural factors. The report said that pesticide expenditures on family-operated cotton farms in the southern Piedmont area during 1953 averaged about \$55 per farm. "In 1951," the report continues, "these pesticides would have cost nearly twice as much. However, these farmers spent around \$80 for pesticides in 1951 as the quantities used were about a fifth less than 1953."

"Expenditures in 1952 averaged about \$40 per farm. These farms averaged fifty-three acres of crops harvested in 1953, of which sixteen were cotton.

"Annual expenditures for weed control materials on wheat-small grain-livestock farms in the northern plain averaged approximately \$20 per farm in each of the last few years." These farms are, much larger than those in the Piedmont, averaging about 475 acres with over 300 in crops.

## Brea Adds Facilities

Brea Chemical Co. is constructing an ammonia conversion plant at 225 Industrial St., Bakersfield, Cal. Comprising three acres in the industrial area developed by Bakersfield Industrial Sites, the plant includes an office building and steel tanks costing \$40,664.

Two smaller tanks 18 x 24 feet already are in place. A large tank with 38,000 barrel capacity, towering 80 feet in the air and 42 feet in diameter is planned.

## Texas City Operates Uranium Recovery Unit

Texas City Chemicals, Inc., is now operating a production unit to recover uranium concentrate as a by-product in its new phosphate products plant at Texas City, Tex.

The unit was designed to recover uranium concentrates as a by-product of feed and fertilizer grade dicalcium phosphate derived from Florida phosphate rock containing minor quantities of uranium.

The first commercial unit for recovery of uranium from phosphate rock has been operated continuously since Sept., 1952 by the Blockson Chemical Co., near Joliet, Ill., where uranium is recovered as a by-product of sodium phosphate chemicals.

## S. C. Laws Studied

A proposal is under study to bring several of South Carolina's state laws on manufacture and sale of chemical fertilizers together in one statute which would yield clarification but create no changes in present regulations.

## Company Briefs

**American Cyanamid Co.'s** bid for the ammonia producing unit of the Missouri Ordnance Works at Louisiana, Mo., was reported to be the best offer received by the Department of Defense.

A rental of \$13.23 on each ton of ammonia produced or a minimum rental of \$343,980 was offered by the company. Cyanamid also asked for a six-year lease, with two six-year renewal options and the right to purchase at any time during the first three years for about \$3,325,000.

**American Agricultural Chemical Co.'s** new fertilizer plant north of Cairo, O., has been formally opened for business. Capacity is expected to be 50-60,000 tons of Agrico and AA brands of fertilizer and 18 per cent normal superphosphate.

Special bulk-loading facilities have been made available for farmers who prefer to buy fertilizer in bulk.

Sales of Atlas Powder Co. reached a record high in 1953 of \$58,788,148, Board Chairman Isaac Fogg and President Ralph K. Gottshall told the company's stockholders in their annual report.

The 1953 sales revenues were 11 per

cent above the \$52,969,883 reported for 1952 and net income from 1953 operations was \$2,231,069, equal to \$3.59 per common share, against \$2,021,961, or \$3.21 per common share.

Eight \$1,000 college scholarships for science students have been set up by Atlas Powder Co. Successful candidates may gain practical experience by summer work between their junior and senior years in one of Atlas' twelve plants or four research laboratories, or with an Atlas technical field representative.

Two separate concerns will be formed from **Canadian Industries, Ltd.** One, Canadian Industries (1954), will be owned over 80 per cent by Imperial Chemical Industries and the other, Du Pont of Canada, will be owned over 80 per cent by the parent Du Pont Co.

The ICI-controlled company will take over a number of production units including five fertilizer plants. Sales of the company in 1953 of \$153.6 million increased seven per cent over the previous year.

**Chemical Enterprises, Inc.,** has amended its original stock registration statement, which was filed with the Securities and Exchange Commission in December, 1953.

The company, which originally sought registration of 350,000 shares of common stock at 25 cents par value, reduced the number to 250,000 shares.

**Commercial Solvents Corp.**'s net earnings for the year 1953 were \$2,656,394, equal to \$1.01 per share of common stock. Net sales were \$51,310,204. Dividends totalling \$2,636,878, or \$1.00 per share, were paid on common stock in 1953, compared with 52 cents in 1952. A dividend of 25 cents per share was declared.

Directors of **The Davison Chemical Corp.** declared dividends for the quarter ended March 31 of 37½ cents on common stock and 57½ cents on Series A preferred stock.

Safety engineers, industrial relations men and some superintendents and their assistants from 12 plants attended **The Davison Chemical Corp.**'s annual safety meeting in Cincinnati, O., Feb. 15-17.

Sales of **Diamond Alkali Co.** reached a record high of \$86,734,279 in 1953, an increase of 13 per cent over 1952. Earnings in 1953 were \$5,939,189 equivalent, after preferred dividends, to \$2.39 per common share outstanding. This compares with earnings of \$5,461,820 or \$2.18 per common share in 1952.

**DuPont Co.**'s sales in 1953 of \$1,750 million topped the 1952 record of \$1,602 million. Earnings were \$4.94 per common share against \$4.70 in 1952.

An improvement and expansion program for **Farm Fertilizers, Inc.**, Omaha, Neb., has been announced by R. E. Bennett, president. New facilities will include the continuous ammoniation process developed by TVA.

Bennett announced that The D. M. Weatherly Co. has been retained in connection with the program and that work is expected to be completed this summer.

**Edward J. Funk & Sons**, Kentland, Ind., plans to establish an anhydrous ammonia distributing plant in Kenton this spring, according to an announcement by Paul Vandervoort.

The firm has leased a plot of ground from the New York Central Railroad as a site for the storage depot.

A new mine at Nash dome, Fort Bend county, Tex., 35 miles southwest of Houston, has been put into production by **Freeport Sulphur Co.**

During the past few years, Freeport has undertaken four new sulfur projects, three located in Louisiana.

**Geigy Agricultural Chemicals**, division of Geigy Co., Inc., has been awarded a bronze "Joshua" plaque for the most distinguished use of match book advertising in the chemical industry in 1953.

A registration statement covering 75,000 shares of its class A common stock was filed last month by **Mallinckrodt Chemical Works** with the Securities and Exchange Commission.

The proposed issue, which is the company's first public offering of stock in its 86-year history, is to be underwritten and distributed by St. Louis investment bankers headed by Newhard, Cook & Co.

**Mathieson Chemical Corp.** sales for 1953 were \$243,575,544, compared with \$147,109,581 in 1952. Net profit after taxes were paid was \$18,755,813, compared with \$13,553,368. After dividends on preferred stock, Mathieson's 1953 earnings amounted to \$3.30 per share on the 5,456,773 shares outstanding at year end.

The 1953 annual report of **Michigan Chemical Corp.** showed a net loss after all charges of \$140,053, or 26 cents a share. In 1952 earnings of 48 cents on 537,077 shares outstanding was reported.

Theodore Marvin, president, said in his letter to stockholders that the company "faces 1954 with considerably improved facilities to reverse the downward trend in sales and profits."

**Monsanto Chemical Co.**'s board of directors declared a regular quarterly dividend of 62½ cents a share on the company's common stock. A 96¼ cent quarterly dividend was declared on Monsanto cumulative preference stock.

Consolidated net earnings of **National Distillers Products Corp.** for the year ended Dec. 31, 1953 totaled \$12,133,410, equivalent after preferred dividends to \$1.18 a share on the 8,498,973 shares of common stock then outstanding. This

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- Nashville, Tenn.
- New Orleans, La.
- Norfolk, Va.
- Presque Isle, Me.
- Sandusky, Ohio
- Siglo, Tenn.
- Waterloo, Iowa
- Wilmington, N.C.
- Winona, Minn.

Also sales offices in Havana, Cuba, and San Juan, Puerto Rico

was an increase of 3.31 per cent over the 1952 net of \$11,744,848.

A new Plant Food division has been established by **Pacific Coast Borax Co.**, to be headed by Dr. James A. Naftel.

Prior to this appointment, Dr. Naftel was southern agronomist for the company, and he will direct the division from his present office in the First National Bank Building, Auburn, Ala.

The plant and property of Sumter Fertilizer and Manufacturing Co., Sumter, S. C., has been purchased by **Planter Fertilizer and Phosphate Co.**

All outstanding 4.50 per cent second convertible preferred stock of **Spencer Chemical Co.** was called for redemption March 15, Kenneth A. Spencer, president, announced. The preferred stock was callable at \$51.50 a share plus accrued dividends of 18¾ cents a share.

**Thompson-Hayward Chemical Co.** has been appointed mid-western distributor in the agricultural field for Udet F surfactants, **Universal Detergents, Inc.** announced.

Thomas Nelson has asked the state circuit court to order **Thurston Chemical Co.** to pay him \$200,201 as compensation for probable future medical expenses, personal injuries, losses in earnings and damage to his tractor. Nelson claims that a dense, pungent fog from the company's fertilizer plant caused him to drive his tractor into a stalled automobile.

**United Fertilizer Co.** is the new name for the Agricultural Chemicals Service Co. of Richmond, Cal. Personnel and officers remain the same as for the two related companies, United Chemical and Heckathorn & Co.

### Net Farm Income Down

Net income of farm operators in 1953 was \$12.8 billion, according to preliminary estimates of USDA's Agricultural Marketing Service. This was five per cent less than the 1952 income, and 13 per cent below 1951, but four per cent above the postwar low of 1950.

## People

**American Cyanamid Co.** has made several new appointments in the Agricultural and Mining Chemicals department of its Stamford Research Laboratories, Stamford, Conn.

Dr. E. L. Starks has been named manager; Dr. J. F. Yost, agricultural chemical group leader; K. G. Nolan, agricultural biological group leader, and Dr. R. B. Booth, mining chemicals group leader.

Alfred M. Esberg has resigned as a director and vice president of **American Potash & Chemical Corp.**

**American Potash Institute** has named Grant H. Braun field agronomist for the Pacific Northwest area, replacing George A. Wickstrom.



Braun

For the past three years, Braun has been in charge of field research for Libby, McNeil and Libby in western Oregon and Washington. He will make his headquarters at 2199 N. W. Everett, Portland, Ore.

Wickstrom has been transferred to the Midwest, and will reside at Columbia, Mo., working under the direction of the institute's Midwest office, located at Lafayette, Ind.

Election of Robert F. Searle as vice president in charge of production and engineering at **Arkell & Smith's** plants at Canajoharie, N. Y., Wellsburg, W. Va., and Mobile, Ala., has been announced by the company.

Harry B. McClure has succeeded Dr. J. G. Davidson as president of **Carbide & Carbon Chemicals Co.**, a division of Union Carbide & Carbon Corp. Davidson has become chairman of Carbide & Carbon and a member of the appropriations committee of Union Carbide.

**Chase Bag Co.** promotions: F. J. Ludington, Jr., assistant vice president, was

elected vice president; William N. Brock, general sales manager, elected vice president and general sales manager; A. H. Nuhn, assistant treasurer, elected vice president, and M. J. Bender, assistant secretary, elected secretary.

R. W. Breidenbach has been named assistant general manager of **Commercial Solvents Corp.'s** Agricultural Chemicals



Breidenbach

Sales department with headquarters in New York City.

Breidenbach joined Commercial Solvents in 1948 and went to its Agricultural Chemicals Sales department from San Francisco, where he was manager of the company's District Office.

New member of the company's Market Development department, Petrochemicals division, is Eugene M. Seidel, who will be located in Terre Haute, Ind.

New administrator of USDA's **Commodity Stabilization Service** is James A. McConnell. He succeeds Howard H. Gordon, who is resigning to return to his former position with Southern States Cooperative, Richmond, Va.

Dr. P. L. Veltman has been advanced to director of research and development from manager of the Curtis Bay Laboratories, **The Davison Chemical Corp.** recently announced.



Veltman

Former manager of research engineering, Ralph E. Hope, has been named an assistant director, his duties including management of the laboratory. L. L. Baral has succeeded him as manager of re-

search engineering.

W. K. O'Loughlin also has been named an assistant director, succeeded as manager of the Development department by O. D. Myrick.

Two new posts, manager of Research Statistics department and manager of Application Research department, have been assigned to Edwin M. Glocker and Luther O. Young, respectively.

J. Sinclair Marks, assistant treasurer of **The Davison Chemical Corp.**, has been elected treasurer to succeed J. Early Hardesty, who has resigned. Raymond S. Clark, Davison's counsel, has been elected assistant secretary.

New president and treasurer of **Downingtown Iron Works**, a division of Pressed Steel Tank Co., is Herbert E. Brumder. Other personnel changes of the Downingtown, Pa., firm include promotion of W. Irwin Pollock to chief engineer; appointment of Edward C. Ashton as manager of sales of heat transfer equipment and K. M. Irwin as manager of the New York sales office.

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Box 455, Farm Chemicals Magazine

Dr. Darrell C. Drake, of **DuPont Co.'s** Agricultural Product Development section, has been transferred from San Antonio, Tex., to Memphis, Tenn., to do pesticide field development work.

Kenneth W. Montfort has been named Pacific Northwest district sales manager for the Agricultural Chemicals department



**Montfort**

of **Eston Chemical division**, American Potash & Chemical Corp. He will direct activities of the department in Oregon, Washington, Idaho, Montana and British Columbia, assisted by Carl Brown at Wenatchee, Wash., and A. B. Davenport in Yakima, Wash.

Prior to joining **Eston Chemical**, he held executive sales positions with Northwest Wholesale of Wenatchee and Pennsalt Co. of Washington.

**Ethyl Corp.** has promoted Wallace F. Armstrong from manager of the Houston plant to assistant general manager of manufacturing. Glenn O. Hayes replaces Armstrong at Houston.

Melvin C. Hudgins has been named assistant manager of the Baton Rouge plant and James J. Bergin assistant manager of the Houston plant.

**Food Machinery and Chemical Corp.** has appointed Dr. William L. Davidson full time consultant.

The corporation's Westvaco Mineral Products division head, William N. Williams, was elected a vice president at a recent board of directors' meeting in San Jose, Cal.

M. H. Whitten is now Maine sales manager of **Geigy Agricultural Chemicals** division of **Geigy Chemical Corp.** He had been assistant sales manager of the Farm Supply department of Maine Potato Growers Coop.

Recently appointed director of **Hercules Powder Co.'s** Traffic department is Herbert W. Jervis. His former position as assistant director has been filled by Alexander W. Fraser.

Carl Hoel is new Minneapolis branch manager for **Howe Scale Co.**, of Rutland, Vt.

J. G. Brunton, former vice president of sales for **Diamond Alkali Organic Chemicals** division, Inc., has joined **Kolker Chemical Corp.**, of Newark, N. J., in a similar capacity.

He joined **Kolker Chemical Works** as vice president of sales in 1949 and continued in that capacity following acquisition of the company by **Diamond** in 1951. He resigned from **Diamond** in December, 1953.

Two new **Link-Belt Co.** district managers: John D. Riley, Cleveland, O., and Harry G. Andersen, Newark, N. J.

Gerald D. Baerman has been named Northeast regional sales manager of the Powell division, **Mathieson Chemical Corp.** and A. E. Collazo has joined the division's Export department in an executive capacity.

Baerman formerly was northeast sales manager for **Geigy Chemical Corp.** and



**Baerman**



**Collazo**

prior to that was in sales work with **Shell Chemical Corp.** Before joining the division, Collazo had been purchasing agent and export manager of **Geigy Chemical Corp.'s** Agricultural division.

**Monsanto Chemical Co.** has named Proctor H. Avon director of engineering for the Organic Chemicals division and Armin L. Klemm as supervisor of wood preservatives and special chemical sales for the division.

George H. Stover is treasurer-business manager of **Oklahoma Fertilizer & Chemical Co.**, replacing Norman G. Jones, who resigned. Otto Clayton now is purchasing agent.

A new Railroad department has been established in **Pacific Coast Borax Co.'s** Agricultural Sales division, to be headed by G. C. Buskirk.

The company also announced the appointment of R. S. Kiester as manager of its Agricultural Sales division's new district office at Houston, Tex.

**Died:** Dr. Charles Lathrop Parsons, 86, on Feb. 13. He was chief chemist of the U. S. Bureau of Mines from 1916 to 1919 and secretary of the American Chemical Society from 1907 to 1945.

Kenneth M. Holaday, Jr., has been appointed as **Pittsburgh Coke & Chemical Co.** sales representative, Agricultural Chemicals division. He will work from the company's office at 75 E. Wacker Drive, Chicago 1.

Insecticide Sales Manager Carl B. Melander has retired from **Pittsburgh Plate Glass Co.'s** Corona Chemicals division. Edward C. Baillie succeeds him.

Arch Carswell, director and vice president in charge of sales for **St. Regis Paper Co.**, was elected a director of **St. Regis Paper Co. (Canada) Ltd.**, at a board meeting last month.

Winner of the 1954 Commercial Chemical Development Association medal is L. V. Steck, vice president of marketing, **Shell Chemical Corp.**

Director of sales for the newly organized Agricultural Chemicals division of **Stauffer Chemical Co.**, its subsidiaries and

associated companies is Dan J. Keating. John H. Kennedy has been appointed eastern sales manager and Robert A. Lamoree, western sales manager of the Agricultural Chemical division.



**Keating**

Keating was formerly manager of the Pacific Northwest division of **Stauffer** and has been with the company since 1926. In 1920, Kennedy started in the chemical business and went to **Stauffer** in 1940.

Lamoree joined **American Cream** division in 1936 and was transferred to **San Francisco** in 1942 as sales manager of **Pacific Coast** activities. Kennedy will be headquartered in **New York** and Lamoree in **San Francisco**.

Kenneth H. Allen has been appointed director of purchases for **Stauffer Chemical Co.** and E. William Eipper has joined the company's Market Research and Development department.

William A. Willis has been named superintendent of **Virginia-Carolina Chemical Corp.'s** new triple superphosphate production unit near **Nichols, Fla.** Willis has been with **V-C** since 1937 and has served with the purchasing, chemical control and mining departments and as **Memphis, Tenn.**, factory superintendent.

Other personnel assigned to the new unit were William C. Thomas and Joseph W. Venable, assistant superintendents; James Edgar Hatch, assistant superintendent in charge of the sulfuric acid plant and M. J. Houston, engineer.

**Died:** Howard T. Rex, 53, president of **Woodville Lime Products Co.** and **Superior Products Co.**

**Wyandotte Chemicals Corp.**, Michigan Alkali division, has made four new appointments. John H. Bahlburg has been named manager, New Products, Organic



**Bahlburg**



**Zorn**

Chemicals department; F. M. Zorn, assistant to the sales manager, General Products group, Inorganic Chemicals; L. M. W. Behm, manager of Order and Scheduling; Scott Starkey, southwestern sales representative and L. A. Jarvis, technical service representative.

**FARM CHEMICALS**

## Associations & Meetings

### California Fertilizer Conference in Visalia

The Second Annual California Fertilizer Conference will be held in the main conference room of Moose Hall, Visalia, on Thursday and Friday, April 29 and 30. It has been developed by California Fertilizer Association's Soil Improvement Committee and Tulare and Kings county directors of the state's Agricultural Extension Service.

The first day's program will include reports on results to date of fertilizer experiments conducted in the two counties. A field tour of fertilizer test plots and alkali reclamation work will be led by Ralph Worrell, director of Tulare county extension, and H. R. Keller, director of Kings county extension.

CFA's Soil Improvement Committee will sponsor the April 30 program, theme for which is "Phosphate." Authorities are scheduled to outline origin and characteristics of phosphate, phosphate in California soils, phosphate availability and movement in the soil. A panel discussion on the problems of phosphorus fertilization of California crops also will be held.

### Cotton Production Session

The cotton disease situation in the Far West will be under close study when ap-

proximately 400 cotton leaders meet in Phoenix for the third annual Western Cotton Production Conference, April 13-14.

Consisting of four half-day sessions, the conference is sponsored jointly by the Arizona Cotton Growers Association, host; Five States Cotton Growers Association and the National Cotton Council.

All persons and organizations interested in any phase of Western cotton production are urged to attend by E. S. McSweeney, executive secretary of the host association.

### Dealer Aid Program Launched by PAM

A nationwide program to help dealers increase sales and profits is being launched by PAM, the Inter-Association Council of Pesticide and Applicator Manufacturers. PAM represents The National Agricultural Chemicals Association, The Power Sprayer & Duster department of Farm Equipment Institute and the National Sprayer and Duster Association.

Members of these associations are co-operating in a program to acquaint the public with the advantages of using the right pesticide with the right applicator at the right time for profits, comfort and health.

### NFA Pasture Award

National Fertilizer Association recently presented Hawkins county, Tenn., an award as state winner of the 1953 Pasture Program. The presentation was made by Russell Coleman, NFA president, to Frank L. Gardner, president of Citizens Union Bank, on behalf of the county.

### S. C. Society Luncheon

The annual luncheon of the South Carolina Plant Food Educational Society for statewide corn contest winners was held at the Jefferson Hotel, Columbia, S. C., on March 1.

### Durand Named NCC Head

New president of the National Cotton Council is A. L. Durand, of Hobart, Okla., who succeeds Harold A. Young, of North Little Rock, Ark. Durand was one of the original group which founded the Council. Young is now serving as chairman of the board of directors.

### Fertiliser Society Meets

At the meeting of the Fertiliser Society, of England, on Feb. 25, Dr. G. W. Cooke presented a paper entitled "Nitrogen and Phosphate Fertilizers in North-West Europe."

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## Fert Sales Outlook in South Good Says NFA

There are indications that most fertilizer manufacturers in the South think 1954 will be a good year for sales despite a drop-off in fall business, the National Fertilizer Association reported after conducting a spot survey in March.

Sales are off substantially since July 1, 1953 in this area, compared with the same period a year ago and reported drops in business averaged 15 per cent, NFA said.

The association plans to conduct similar surveys in other areas of the country as the season progresses, and a country-wide survey toward the end of the season.

## Joint Meetings Held By Colorado Group

More than 100 changes in recommendations for control of insects in Colorado have been adopted as a result of the third annual joint meeting of the Colorado Agricultural Chemicals Association and the Colorado Agricultural Chemicals Clearing Committee held in Denver on Jan. 29, the association reported.

At its separate meeting the same day, CACA elected Ralph W. Farr and Orval J. Schall new directors. Walter D. Smith, Denver Fire Clay Co., was named president; Farr, vice president, and Claine E.



Smith



Titensor

Titensor of Agricultural Processing Industries, former CACA president, secretary-treasurer.

Committee chairmen appointed include Fred Cherry, Rohm and Haas Co., fungicides; E. C. Stone, Denver, herbicides; Harold Mankoff, Manco Chemical Co., rodenticides; Howard Beaudoin, Velsicol Corp., insecticides; Floyd Knauss, Thompson-Hayward, membership; Robert Reidner, Shell Chemical, legal, and J. Newton Hall, Pioneer Chemical Associates, publicity.

## 303 Members in Ga. Group

Membership in the two-year-old Georgia Plant Food Educational Society totalled 303 in 1953. Of this number 259 were active members and 44, associate members.

Officers of the society, elected in December, 1953, are: president—W. A. Higginbotham, Jr., Armour Fertilizer Works. Vice presidents—Malcolm Rowe, Rowe Warehouse & Fertilizer Co., district 1; John L. Sanders, Spencer Chemical Co.,

district 2; Charles Ellis, Mutual Fertilizer Co., district 3, and J. I. Davis, Southeastern Liquid Fertilizer Co., district 4. Secretary-treasurer—J. Fielding Reed, American Potash Institute.

## Ag Lime Convention

Highlighted at the annual convention of the National Agricultural Limestone Institute, Feb. 19-20 in Chicago, were two panel discussions on operating problems of industry and promotion of limestone for soil treatment.

The following officers were elected: John M. Deely, Lee Lime Corp., president; John H. Riddle, Riddle Quarries, Inc., vice president; Robert M. Koch, executive secretary, and Alvin R. Armbrust, Fayette Limestone Co., treasurer.

## Weed Control Meet

Suitable means of utilizing 2, 4-D as a valuable tool for controlling weeds and brush, but at the same time preventing damage to other crops was discussed at a recent meeting in Shreveport, La., called

by the National Cotton Council and attended by representatives of USDA, land-grant colleges, the chemical industry, rice and cattle growers, state regulatory officials, custom applicators, the Civil Aeronautics Administration and the cotton industry.

## New MCA Members

The Manufacturing Chemists' Association has announced the election of five new member companies. Those newly elected include Carlisle Chemical Works, Hoffmann-LaRoche, Inc., Olin Industries, Inc., Pacific Coast Borax Co. and Thiokol Chemical Corp. MCA says its member firms now account for more than 90 per cent of the Nation's chemical industry capacity.

## Award to Lipscomb

Ed Lipscomb, director of sales promotion and public relations for the National Cotton Council, has received his third award from the Freedoms Foundation.

# New Farm Chemicals

## General Chem. Markets New Silage Preservative

Because there is less spoilage, silage put up with "Sta-Fresh" retains more carotene (vitamin A) and approximately twice the natural sugar of untreated silage, its producer, General Chemical division, Allied Chemical & Dye Corp. states.

Sta-Fresh is General Chem.'s trade name for a new silage grade of sodium bisulfite, also known as anhydrous sodium bisulfite, ABS, bisulfite and sodium metabisulfite. The company says that in Pennsylvania and other states, county agents are leading boosters of the new silage chemical.

## Rodent Repellents Tested

Rodent attacks on paper board were reported significantly decreased in studies with trinitrobenzene and its arylamine complexes sponsored by the Office of the Quartermaster General.

## Endothal is Common Name

Pennsylvania Salt Manufacturing Co. has announced it is relinquishing its trade mark rights to the name Endothal so that this term may be used as the common name for 3, 6-endoxohexahydrophthalic acid.

The name endothal has been considered suitable for common use by the nomenclature committee of the American Medical Association and the American Chemical Society, and its use was approved by the Committee on Terminology of the North Central Weed Control Conference.

## Rose Dust Added to Swift End-O-Pest Line

End-O-Pest Rose Dust has been added to the Vigoro Family of Swift & Co.'s Plant Food division. Included in the mixture is malathion, captan and karathane, as well as DDT.

Swift claims the dusts outstanding features include ability to control powdery mildew and red spider as well as aphids, rose midges, rose chafer, rose curculio, Japanese beetles, rose slugs, black spot, anthracnose and all other rose insects and fungus diseases.

Packed in a 10-ounce refillable dust gun and a three-pound bag, the material will be available at garden supply stores at about \$1.50 for the gun and \$3.75 for the three-pound bag.

## Naugatuck Makes MH-30

MH-30, a liquid maleic hydrazide, has been developed by Naugatuck Chemical division, U. S. Rubber Co.

The chemical, which is said to stop secondary growth on tobacco plants, will be available this season for use on flue-cured tobacco in Georgia and South Carolina, where USDA has granted it registration.

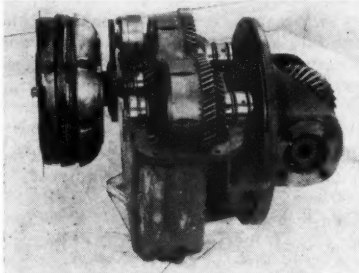
## New Coined Names

The Interdepartmental Committee on Pest Control recently announced that dichloro and glyodin are coined names for 2, 3-dichloro-1, 4-naphthoquinone and 2-heptadecyl glyoxalidine acetate, respectively.

## Equipment & Supplies

### Hydratork Drive for Clark Fork Trucks

Gas-powered Clark Carloader-model fork trucks in 3-5,000 pound capacities now are available with Hydratork Drive—a transmission which does away with the need for a gear shift, high and low gears



Hydratork Drive

and a clutch and clutch pedal, according to an announcement by Clark Equipment Co.

The Hydratork Drive combines a torque converter with a simple constant-mesh transmission, making it possible to operate a gas-powered fork-truck with three controls—accelerator, brake pedal and a forward-reverse selector level located on the steering column.

### New Wear Resistant Alloy

Fertilizer mixer blades, conveyor rollers and other parts which have relatively short service life because of abrasion, get a "longer lease on life" when cast in a new chrome-ferrous-alloy called ZeVeScal W series, the manufacturer states.

Field tests on the Calumet Steel Castings Corp. product indicate that parts made from it outwear identical items cast in commonly used wear-resisting alloys by as much as three to one.

### Howe Truck Scale

Howe Scale Co.'s new Four-Section Straight Lever Railroad Track Scale is designed and constructed in accordance with specifications of the American Railway Engineering Association.

Its features include patented wedge adjustment, platform double-bearing yoke, interchangeable allow steel knife edges and bearings plus proper clearances of all suspension elements.

### Flexoveyor Unloader

In operation, the new Flexoveyor Box Car and Truck Unloader carries bags on a flexible spring conveyor, through a hug-

ger boom section which compactly flattens each bag for storing in minimum space, according to a release from the manufacturer, Flexoveyor Manufacturing Co.

Powered by a 1½ HP Gearmotor which also drives the flattener, the unloader runs at a speed of 120 feet per minute, delivering 1,000 bags per hour, and can be engineered to suit varying conditions.

The flexible section of the conveyor is equipped with side rails which steer the bags properly into the flattener. The discharge end is equipped with a hydraulic jack for raising and lowering when loading to pallets.

### Bristol Instrument System

The Bristol Co. has announced a new three-part pneumatically operated instrument system known as the Metagraphic System.

Units are a transmitter, receiver (recorder or indicator) and a controller. Each unit can be installed on the process at the point where it operates best, thus providing a high degree of flexibility of application. Metagraphic instruments measure, indicate, record and control pressure, vacuum, temperature, liquid level, differential pressure and flow.

The entire system has been designed, according to Bristol, to reduce design engineering problems, to make it possible to do all maintenance work in the shop and to keep a process operating with a minimum of downtime due to instrument maintenance.

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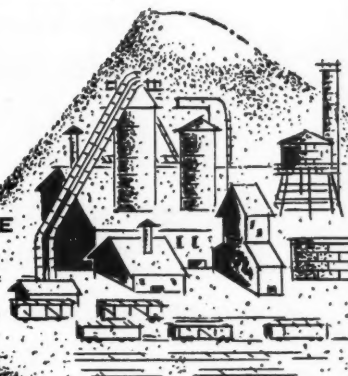
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## Pennsalt Floor Coating

NeoFloor is a new, economical, easily applied skid-proof surface coating for concrete, wood and metal floors, according to its manufacturer, Pennsylvania Salt Manufacturing Co.

Developed for use in plants, shops and other places where oils, greases and chemicals create safety hazards and maintenance problems, NeoFloor provides safe footing and long lasting surfaces which stand up under heavy traffic, heat-aging and other rugged conditions, Pennsalt states.

## Explosion-Proof Fixture

A new explosion-proof lighting fixture with prismatic Holophane reflector has been developed cooperatively by Crouse-Hinds Co. and Holophane engineers. It is said to allow technicians to perform highly detailed tasks at hazardous locations without eye-strain.

For complete safety in locations where flammable gases may be present, lamp and wiring compartments are individually explosion-proof. The cast aluminum construction can resist internal explosions without damage and flame-tight threaded joints, requiring no seals or sealing compounds, prevent the escape of flames or gases.

## Suppliers' News

With grain storage problems almost a sure thing for the coming year, salesmen in the Farm Equipment division of **Butler Manufacturing Co.** were told by management that this could be a bonanza in reaching record sales goals.

**Clark Equipment Co.** recently announced plans to erect a new plant on the outskirts of Benton Harbor, Mich. The 145,000 square foot building will be used as an assembly plant for a new line of tractor shovels to be produced by Clark and for assembly of power shovels now made in the present Benton Harbor plant.

Sales representatives have been appointed by **Marietta Concrete Corp.'s** Industrial Silo division in four additional cities. New representatives are Mayer & Oswald, Chicago; Matt A. Doetsch Machine Co., Washington; Alcar Builders Specialties, Inc., Philadelphia, and Critz Engineering Co., Cincinnati.

Claims totaling \$2,239,368 filed against the estate of the late **Isaac T. Rhea**, president of **Mente & Co.**, were dismissed by a federal judge in February.

In declaring a summary judgment for Mrs. Louis Baxter, Judge M. S. Boyd ruled that there was no issue of fact and the claimants, Harold Danziger, F. J. Apollonia, O. F. Littlefield, J. M. Wood

and Marshall L. Harper, could not sue on the basis of an oral contract which was contrary to the Rhea will.

Two new representatives for **Pulva Corp.**: E. A. Peterson, 7520 S. Evans Ave., Chicago 19, Ill., and D. B. Gooch Associates, Inc., 8008 First Avenue N., Birmingham 6, Ala.

Contracts have been placed by **Reliance Electric and Engineering Co.** for a new plant addition to its Ashtabula, O., division, according to an announcement by J. W. Corey, president.

Two manufacturing divisions of **Robertshaw-Fulton Controls Co.** have won Freedoms Foundation awards. The company has also been awarded a certificate of cooperation by the Mutual Security Agency for "furnishing technical assistance to the peoples of friendly countries."

Gound has been broken for a new 237,000 square-foot plant in Long Beach, Cal., to house the Grayson Controls division of **Robertshaw-Fulton Controls Co.** The division now is located in Lynwood, Cal.

New additions to the line of **Tri-State Petroleum Co.** include Tri-State No. T-S-21 Multi-Purpose Ball & Roller Gearing Grease designed to replace nearly all special lubricants. It has no melting point, will not break down or bleed—even at very high temperatures. It is available in 100 and 400 lb. net drums, 25 lb. net pails, five and one lb. net cans.

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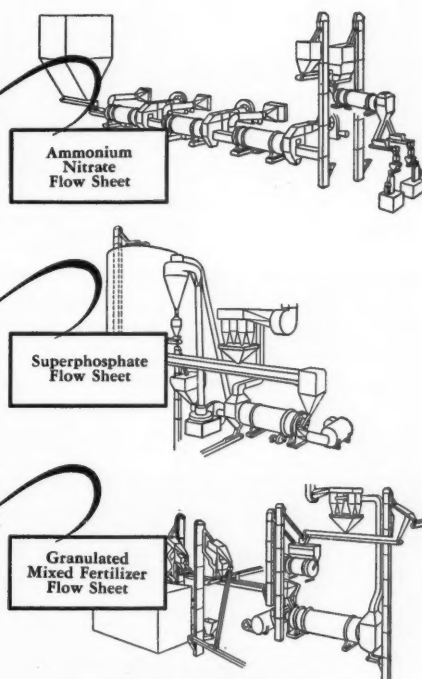
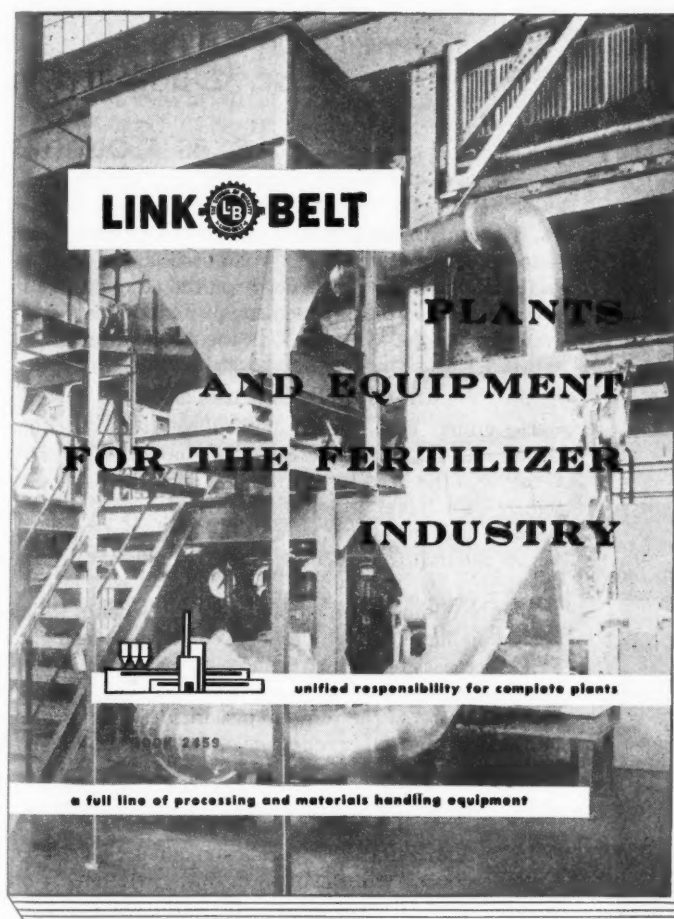
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APRIL, 1954

21

## Industry Problems Discussed at Spring Convention

# 2, 4-D Ban Revealed at NAC Houston Meet

### Use Outlawed in 7 Texas Counties

**N**ATIONAL Agricultural Chemicals Association members attending the spring meeting heard John C. White, Texas commissioner of agriculture, announce that for the first time his department has invoked the power to outlaw a hormone weed killer. He stated that the use of 2,4-D is now prohibited in seven Coastal Bend counties.

Over 250 delegates met in the Hotel Shamrock at Houston on March 24-26 to hear White and other well known speakers discuss current industry problems. Only the first session was open to members, guests and the press. For the other two days, the press was barred from all meetings.

Paul Mayfield, NAC president, delivered the first address after the meeting was called to order by

H. J. Grady, program committee chairman. Mayfield told the group that "your association and the industry have gone on record for the second time in six months for the endorsement of Federal legislation (referring to the Miller Bill) in the public interest."

#### Industry Recognizes Need

He added that the Miller bill serves to further protect the public interest and that the industry recognizes the need for putting into law the principles which "we have practiced during the past several years." This is one way, Mayfield explained, in which the industry acknowledges its obligation to the public.

The NAC head also emphasized the benefits which pesticides have brought to this country, pointing to yield increases of various economic crops. He termed the fact that many of these increases followed the introduction of the newer insecticides, fungicides, herbicides and other chemicals, "a remarkable coincidence."

#### 2,4-D Affected Cotton

In outlining the new regulation on use of 2,4-D, Commissioner White explained that toxic effects on cotton fields in areas where the herbicide has been used extensively on rice fields was the major reason for the ruling. He recommended the use of 2,4,5-T which he said was equally as effective as 2,4-D but is five to 10 times less damaging to cotton.

The regulation became effective immediately, White stated, adding that custom sprayers and farmers in the restricted area would have 20 days in which to comply. After this period, herbicide operations in the affected area will be closely supervised by

Paul Mayfield, association president, presents an award to Mrs. Gale Whitcomb to show NAC's appreciation for the use of the Whitcomb Ranch as site for Chuck Wagon Dinner, while her daughter Jerry, watches proceedings.



FARM CHEMICALS

department inspectors, he said, and spraying equipment will be checked every thirty days.

Airplane spraying is also affected by the new ruling and application of herbicides by this method is prohibited in the Stafford-Missouri City area where cotton and rice fields are closely intermingled.

White pointed out that the rice grower-cotton farmer battle over 2,4-D has a brighter outlook and said that since 1948-49, when over 2,000 cotton damage complaints were registered with his office, the number of officially registered complaints has dropped to 112. He gave credit for this decrease to farmers, chemical companies and the agriculture colleges.

In closing, the commissioner urged that the chemical industry continue its efforts to uncover a herbicide that can be used on rice without damage to cotton plants.

### Research and Progress

"Today's research is tomorrow's progress" was the theme of a talk by R. D. Lewis, director of Station, Texas A & M College. Lewis stated that "during the first half of this century, scientific knowledge and methods changed our manner of living more than any form of human endeavor has in the past."

He added that agricultural progress becomes more and more vertical and less horizontal as we apply to the soil and plants new techniques, chemicals, cultural practices and plant creations. "There is a crying need," Lewis stated, "for greater support of so-called fundamental or basic research." Lewis stated that he found it as difficult to sell the concept of basic research to companies as to legislators.

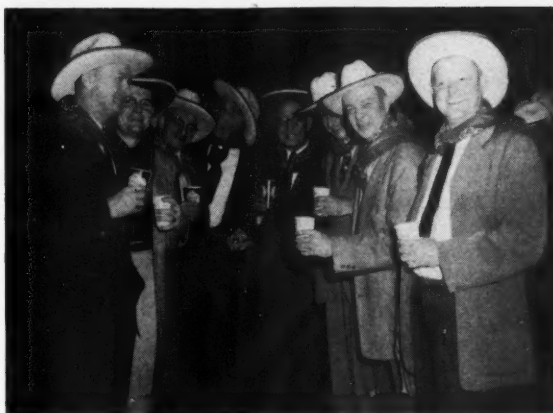
Following Lewis' remarks, J. A. Walker, credit manager, Standard Oil Co. of Cal., discussed the credit situation of the farm chemicals industry.

Dr. F. C. Bishopp, coordinator, Pink Bollworm Research Center, told NAC members that insecticides are solving not only food and disease problems but are also useful in flood control and against erosion. He pointed out that insects kill more timber than forest fires, grasshoppers denude land worse than livestock and that the result of both is land which fails to hold the moisture of either rain or snow, the resulting runoff speedily turning into floods.

### 'Greatest Gifts to Science'

Dr. Bishopp said that he regards "DDT, and the insecticides developed following its discovery among the greatest gifts of science to man." He asserted that insecticides will play a large part in the farm economy of this country during the next few years.

The speaker pointed out recent USDA estimates which indicate that the total chemical control of crop



**TOP:** Mrs. Mercedes Karr; K. K. Krausche, Pennsalt Mfg. Co., and Leo Reel, Atlas Pipe Inc., relax at the dinner.

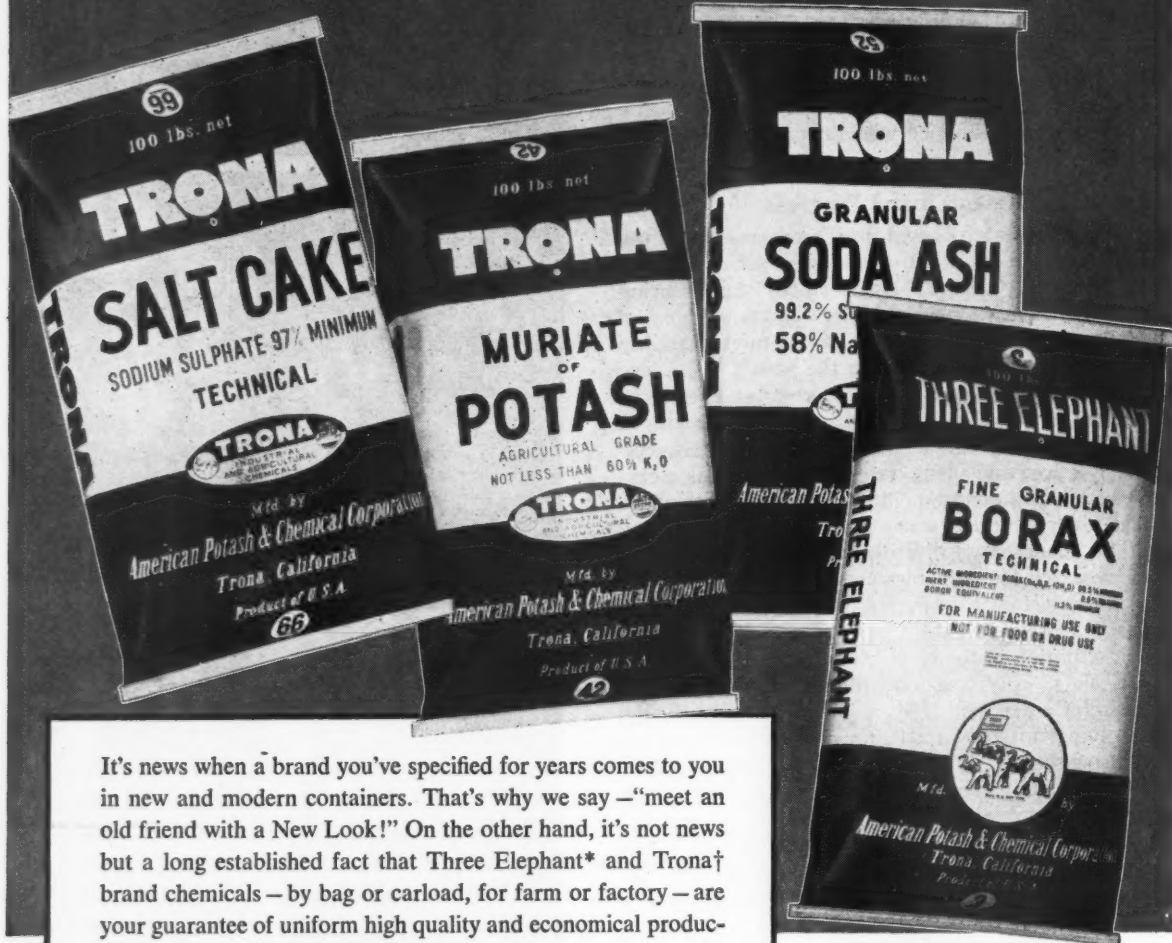
**SECOND:** NAC "cowpokes" left to right, are R. O. Hartley, John Powell & Co.; J. W. Moore, Floridin Co.; W. K. Feustel, R. T. Vanderbilt Co.; Clark Bellamy, Acme Fertilizer Co.; John Chase, Port Fertilizer & Chemical Co.; W. P. Crown, Carolina Chemicals, Inc.; Roger Molster, Wyandotte Chemical Co., and John M. Norcott, Wyandotte.

**THIRD:** Mr. and Mrs. W. M. Jarnagin and Mr. and Mrs. R. W. Wert, Attapulugus Min. & Chem. Corp. at hotel entrance.

**BOTTOM:** C. Whinfrey, Pennsalt Mfg. Co.; John A. Rodda, U. S. Ind. Chem. Co., and E. A. Georgi, United Coops.

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**UPPER LEFT:** Dick Barton, Ethyl Corporation, eating with Mr. and Mrs. Ernie G. Holmes, Stauffer Chemical Co.

**ABOVE:** NAC Association members and guests line up for "chow" at Chuck Wagon Dinner, which was held Thursday.



**Members of NAC staff—**Lea S. Hitchner, executive secretary; Miss Lee H. Grobe; Val E. Weyl and Jack Dreessen.



**D. B. Dickey, Mathieson Chemical Corp.; Mr. and Mrs. Ben Lindsey, Milwhite Co., Inc.; Felton Byrd, U. S. Rubber Co.; Miss Muriel Pemberton, Shell Development; L. G. Matthews, American Smelting and Refining Co. In background, R. A. Lamoree, Stauffer Chemical Co.**

diseases in the United States would save \$2,800,000,000 or about seven per cent of potential production of all farms and forest products. He added that the complete control of all insects would save between four and 10 billion dollars.

"There seems to be little doubt," he concluded, "that without the protection afforded by insecticides, many crops would be destroyed completely, armies would be rendered impotent by insect-borne diseases, the march of terrible scourges across the country would be rapid and the appalling burden of malaria would continue as a millstone around the neck of the people in vast areas of the world."

No information was released on speakers or discussions in the closed sessions; however, the program stated that the second meeting was to "cover a discussion of the everyday problems relating to the research, production and use of pesticides."

### Scheduled Speakers

Speakers scheduled to appear on this program and their topics included: opening, W. W. Allen, NAC vice president; welcome from Houston Mayor Roy Hofheinz; secretary's report, Lea Hitchner, NAC executive secretary; "Technological Implications," H. L. Haller, Government-Industry Liaison; "Public Reaction to Pesticides," J. Clyde Wilson, president, Arizona Cotton Growers Association. The talks were to be followed by a question and answer period.

The program for the last day was said to provide "facts and reliable methods for the successful operation of your business as well as that of your customers."

Speakers included, according to the program: opening, Paul Mayfield; "Responsibilities of Labeling, Advertising and Marketing," C. S. Maddock, chairman, NAC Lawyers Committee; "Sound Cost Accounting," W. T. Seney, associate, McKinsey & Co., and "How to Get Better," J. E. Burger, sales manager, Corneli Seed Co.

Some information was made available on the talk by Mr. Seney who emphasized that companies follow sound cost accounting practices in determining whether to hold prices at the risk of reduced volume, or to try to maintain volume while cutting prices.

Use of such practices, he stated, should minimize risks of serious loss through unwarranted reductions of volume or price. He recommended that each manufacturer review carefully his own profit plans before taking action on prices.

A sound cost accounting system, as described by Seney, should include these procedures: organize cost facts so they can be used for estimating profit results; keep records simple and know all cost facts. He recommended that companies keep up to date on liability suits based on alleged damages from pesticides.

Some companies, he added, have found themselves with stocks of unsold inventory and as a result have faced excessive warehousing charges. Other unforeseen risks, Seney concluded, could be better met if sound management planning provided the facts in advance.

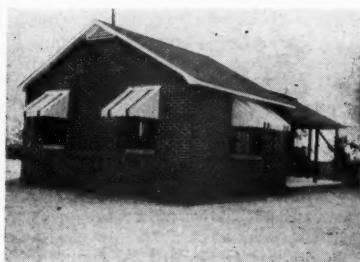
The social calendar for the convention included a Chuck Wagon Dinner, boat trip for 48 persons through the Houston port facilities and a golf tournament.

**TOP RIGHT:** Mrs. Sally Trombley; Mrs. Mercedes Karr; Nick Trombley, Monsanto Chemical Co., and Errol Karr, Pennsylvania Salt Manufacturing Co. of Washington.

**RIGHT:** Mr. and Mrs. J. V. Miller, Atlas Powder Company, sitting in the lobby of the Hotel Shamrock in Houston.



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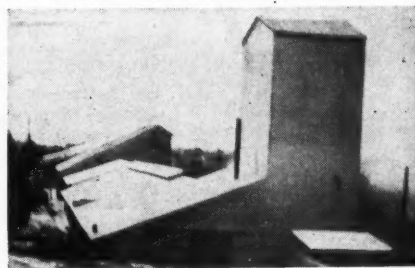
Micron Size	
%	Microns
43.6	0 - 1/2
12.2	1/2 - 1
12.6	1 - 2
14.2	2 - 5
6.9	5 - 10
10.5	10 - plus

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Fe <sub>2</sub> O <sub>3</sub>	0.57%
CaO	0.00%
MgO	0.00%
Na <sub>2</sub> O:K <sub>2</sub> O	0.00%

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# Production Begins at Tacoma NuLife Plant

By Michael A. Rivisto  
*Carstens Packing Co.*

**I**N STEP with the progress of the Northwest it serves, the history of Carstens Packing Co., from its beginning at the turn of the century, has been one of steady expansion.

The newest addition under Carstens' expansion program is the NuLife fertilizer plant built in the industrially revitalized area of Tacoma's tideflats.

The company's Fertilizer division was organized in 1915 with J. H. Beidler as manager, who continued in that capacity until his retirement in 1939. C. E. Beckwith succeeded him until 1951 when the present manager, Fred Parcher, took the helm.

The company's fertilizer brand name, "NuLife," was adopted in 1928 and has been in use ever since for NuLife Lawn and Garden Fertilizer. In 1952, the brand name was adopted as a trademark for all fertilizer products manufactured by Carstens.

## Serving the West

Thomas Carstens, Sr., in establishing the Fertilizer division, began extensive research into the chemistry

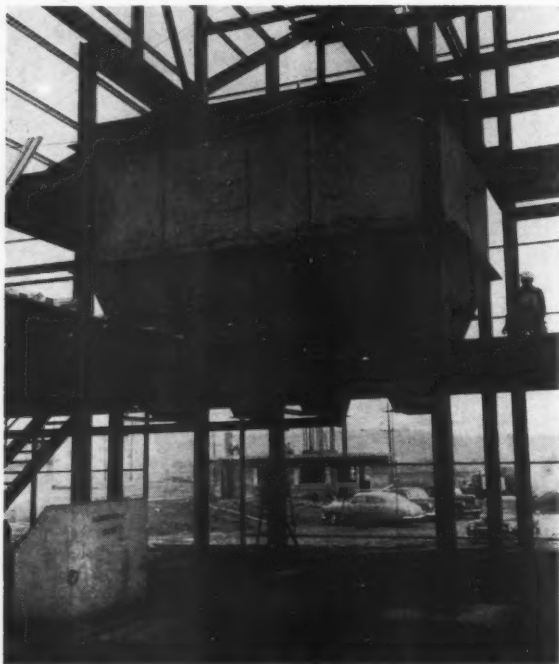
of fertilizer manufacturing. Seeing a great need for a fertilizer suited to the climate and soil conditions of the Northwest, he developed the present NuLife fertilizer to obtain the best results from the region's unique soil characteristics.

Additions to the original construction began almost immediately to mushroom, expanding to meet the ever-increasing market.

The old plant, lacking perhaps in modern facilities and surviving three fires, one of which almost spelled its death, served a market of approximately \$1,500,000 developed from its successful formula. Distribution of NuLife has spread throughout Washington, Oregon, Montana, Idaho and Alaska.

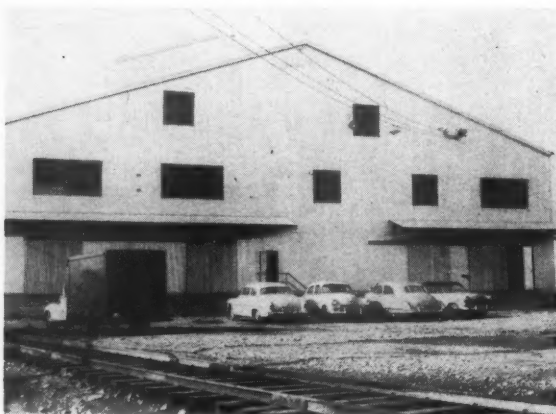
## Modern Building and Facilities

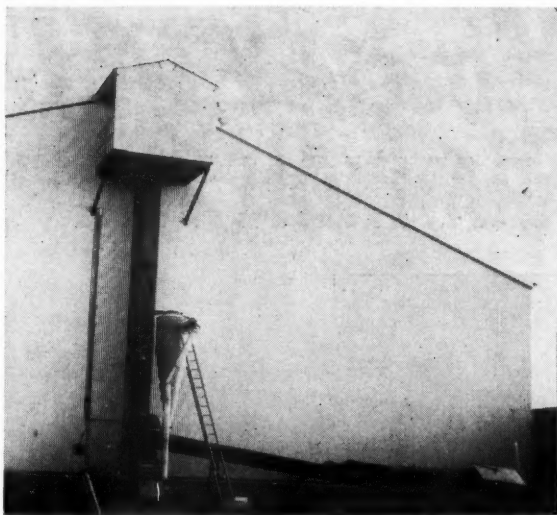
The new four-story plant is a fertilizer manager's dream. It features modern conveyor systems, speed-up methods and a great deal of elbow room. The building is 100 feet by 120 feet and has a storage capacity of approximately 4,000 tons, with a total floor space of about 16,000 sq. feet.



Left: Batch weigh hoppers. New plant construction was supervised by Otto Stolz, plant engineer.

Below: Front view of the Carstens plant, showing four loading-out doors and one car-loading spur.





Rear view of building, showing vertical bucket elevator and screw conveyor from bulk car unloading hopper.

Curing and ageing bins with ample storage capacity have been installed with appropriate conveyors. The production capacity has been increased one-and-one half times, offering a new capacity rate of 120 tons per eight hour working day.

Construction was supervised by Carstens' plant engineer, Otto Stolz, of Tacoma, Wash., and the new plant, with 130 tons of structural framework, was completed and in operation for business on Feb. 5, 1954.

The increased production rate and push-button system has enabled the plant to decrease its labor cost; however, it will maintain a better balanced year-round employment.

The plant also boasts an elevator system which is capable of filling the multi-section mixing operation previously conducted manually.

There are nine bins for bulk materials which may be divided and rearranged to suit the desired operational requirements. This special arrangement is another modern facility which tends to make the plant a diversified operation.

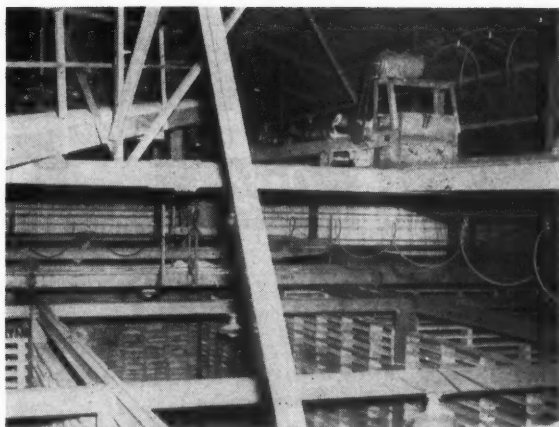
The new plant production system has been planned on a fully automatic basis, with many features of time- and labor-saving convenience to reduce the laborious phases of the old system. As Parcher said, "It's so automatic that we can almost safely inform the public that this NuLife is manufactured 'untouched by human hands.'"

#### Located on Tideflats

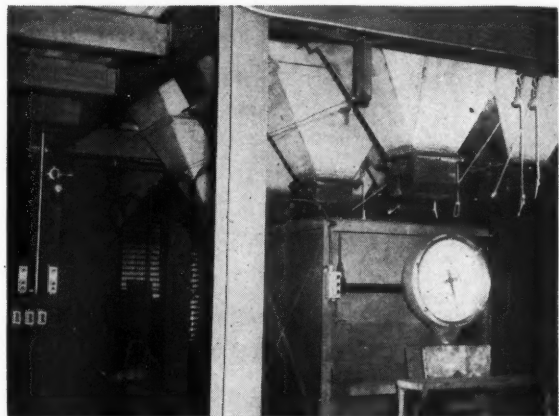
The plant brings a modern industry to Tacoma's newly developed tideflats. The city of Tacoma has long publicized its 300 acre tideflats as an area most advantageous to industry. The tideflats, as it is commonly known, is developed with hydraulically-pumped sand filled to street level. Served by municipal railroads which connect with the four trans-continental railroads, it also features no switching charges to industry on line haul freight.

The tideflats district is surfaced with paved streets, offers bus services and boasts of having one of the

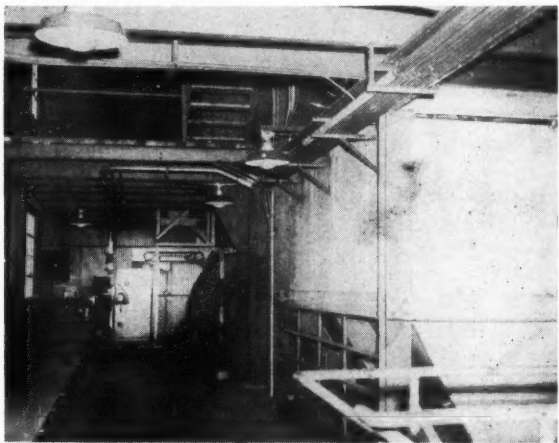
APRIL, 1954



Conveyor floor, showing two shuttle conveyors. Total floor space of the building is about 16,000 square feet.



Batch weigh hopper on main floor. Production capacity of the plant has been increased one-and-one-half times.



Interior of bagging floor shows St. Regis valve packer, batching bins and Stedman mixer at the Carstens' plant.

five best harbors in the world. It has waterfront and non-waterfront land.

All the necessary utilities required by big-time industry are available—abundant water and power supply, fire hydrants, both land and sea transportation and close proximity to the Tacoma-Seattle International Airport. ♦

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# Double CA Holds



Retiring CACA president, J. H. D. Ross of Canadian Ind., gives advice to new president, A. H. Carter, Sherwin-Williams Co.

# First Annual Meeting

By Sam Lewis Veitch  
*Publisher*

**I**N TORONTO, it was a great day for the pesticide industry. On Friday, Feb. 19, the first annual meeting and conference of the Canadian Agricultural Chemicals Association was held at the Royal York Hotel, Toronto, with the surprising attendance of nearly 200 persons.

Delegates elected Arthur H. Carter, general manager, Green Cross Products, Sherwin Williams Co. of Canada, Ltd., president of the association succeeding J. H. D. Ross, Canadian Industries, Ltd. Other new officers include M. F. Anderson, Naugatuck Chemical Co., 1st vice president; W. R. Geddes, North American Cyanamid Co., 2nd vice president; R. G. Smith, Charles Albert Smith Ltd., secretary and K. B. Owens, Monsanto (Canada) Ltd., treasurer.

## Panel Discussion

The conference theme, "More Effective Pest Control Through Cooperation," was highlighted by a panel discussion of Canada's major insect control problems by members of the Science Service, Canada Department of Agriculture.

G. G. Dustan, officer-in-charge, Fruit Insect Laboratory, who was the first panel speaker, stated that "wire worms are the worst pests in Canada," adding that white grubs are an important problem principally in the Quebec section.

Dustan pointed out that there is no single effective control for root maggots, a principal concern of vegetable growers, and named the onion and corn maggots, carrot rust fly and grasshopper as other major pests.

Lead arsenate, DDT and parathion were cited by Dr. A. P. Arnason, assistant head, Field Crop Insect Unit, as the three chemicals used to get good, clean fruit. Of the three, Arnason stated, lead arsenate is the most popular. In Canada, there is a swing toward safer chemicals, although parathion is effective on mites and aphids. "Malathion," Arnason said, "is being used in some places instead of parathion."

One of the more important comments made by Dr. J. J. Fettes, assistant chief, Forest Biology division, in his remarks concerning dusting problems was that "the airplane is not efficient, although some claim it is."

Other members of the panel included Dr. H. E. Gray, head, Stored Product Insect Unit, and Dr. G. E. Peterson, assistant entomologist.

## Mayfield Speaks

A feature of the conference was a talk by Paul Mayfield, Hercules Powder Co. and president of the National Agricultural Chemicals Association, who told the group of the work of NAC and pointed out some of the many ways in which an industry association can be of service to its members.

Citing the legal and moral responsibility of the manufacturer in producing good pesticides, proper merchandising and education of dealers and consumers, the Hercules official said that an overall broad policy for the industry is essential even though each individual company uses available facilities to promote its products and interests.

"What your association—and ours—can do," he said, "is to create a favorable atmosphere for the industry as a whole, in which individual free competition has full play."

Mayfield emphasized the task of combatting "misinformation, downright exaggeration and pseudo-scientific double-talk," and summarized the ways in which NAC is attempting to combat this problem. Work being done in traffic, product liability and other NAC areas of activity also was briefly discussed.

## Report by Ross

Activities were opened by J. H. D. Ross, first president of the association who, in his annual report, gave a short resume of the events preceding the organization of CACA.

On Oct. 8, 1952, according to Ross, representatives of eight companies met in Montreal at the invitation of Arthur Carter to discuss the pros and cons of forming an association for the Canadian pesticide in-



J. H. Elliott, Rohm & Haas Co. of Canada; B. S. Hyde; W. Scott James, Agric'l Chem. Div., Pittsburgh Coke & Chemical, and R. F. Byrnes, Rohm & Haas Co., Phila., Pa.



G. G. Whinfrey, Pennsalt; M. D. Reichard, Stauffer Chem. Co.; E. W. Phelps, Niagara Brand Spray Co.; J. G. Hastings, Canadian Industries, and Les A. Kuhn, Stauffer.



#### Officers and Directors CACA, 1954

Left to right: K. B. Owens, treasurer; R. G. Smith, secretary; G. E. Willan, director; Arthur H. Carter, president; R. M. Ferguson, director; J. H. D. Ross, director; M. F. Anderson, 1st vice president; J. D. Ruttan, retiring director. W. R. Geddes, the association's 2nd vice president, is absent from picture.

dustry. Lea Hitchner, of NAC, attended that meeting and described the organization of his association.

The decision was made to incorporate a trade association and the first meeting of CACA members was held in June, 1953. Since that time, company membership in the group has grown to a total of 28.

Ross went on to describe the organization of CACA, outlining membership requirements and describing its activities.

Wallace Murdoch, president, Ford Tractor and Equipment Sales Co. of Canada, Ltd., began the afternoon program with a talk on "Merchandising to the Farmer." In selling products such as farm chemicals, Murdoch stated, "the customer must be totally convinced that it will pay him to use the product."

He emphasized the importance of keeping the farmer aware of technological improvements and developments and showing him how to use them to the best advantage. Murdoch said that his organization found it pays to give individual attention to every complaint.

Murdoch advocated that stress be placed on advertising, especially in the "advertising press" and reminded listeners that demonstrations are of prime importance in selling to the farmer.

#### Canadian Weed Problems

In a talk on "Cooperation in Solving Canada's Major Weed Problems," H. E. Wood, Manitoba Department of Agriculture, estimated that weeds in the Canadian Prairie provinces during 1953 took a toll of \$225 million or 20 per cent of all returns from field crops.

Dr. A. W. A. Henry, University of Alberta, speaking on seed treatments, told the association that the successful production of grain crops rests in large measure on the quality of seed sown and care taken in seed production.

Henry acknowledged that not all crop seed is now being treated but said that there is a considerable potential for the use of pesticides. Reviewing the materials now used in Canada, he said that non-

mercurials other than formalin are being used to a small extent in Alberta, adding that their popularity seems to be on the increase, especially for treatment of wheat. Organic mercurials, according to Henry, are the most commonly used and recommended on small grains and, although discouraged for some time, formalin treatments are still quite extensively used in Alberta.

### Public Relations

The afternoon session was concluded by C. C. Pettet, president and general manager, Canadian Paint, Varnish and Lacquer Association. Speaking on "The Importance of Good Public Relations to an Industry," Pettet said that this phase of association endeavor should include a fostering of a spirit of co-operation and good-will between industry and government.

"The most potent aspects to be considered in devising a public relations program," Pettet continued, "are that the information must be truthful—and unembellished—that it must be brief in fact, and must, for broad acceptance, be couched in simple but strictly understandable language."

He summarized good public relations as the compilation of "good and truthful information, which in an exacting manner deals with our respective industry, its products or services. It should inform the general public of the national and community value of the industry and, wherever possible, it should highlight the benefits that accrue to the individual and his family.

"If such a program is well designed and operated with the complete cooperation and working support of all factions of the industry," Pettet concluded, "good-will, support and assistance will be forthcoming from a large percentage of the country and the community in which the industry conducts its business."

Dr. J. G. Taggart, deputy minister, Canada Department of Agriculture, was scheduled as speaker at the evening banquet but was unable to attend. His place was filled admirably by Dr. K. W. Neatby, director, Science Service of the department.

Neatby reviewed the growing importance of farm chemicals and, speaking of the control of plant pests, cited the need for close cooperation between the industry and the various provincial departments of agriculture. He saw in the formation of CACA a means of furthering such cooperation.

"If we can only hold our own with insects," he added, "we will be fortunate." In closing, Neatby said that he would like to see more research done by private industry rather than leaving it so completely with the government. ♦

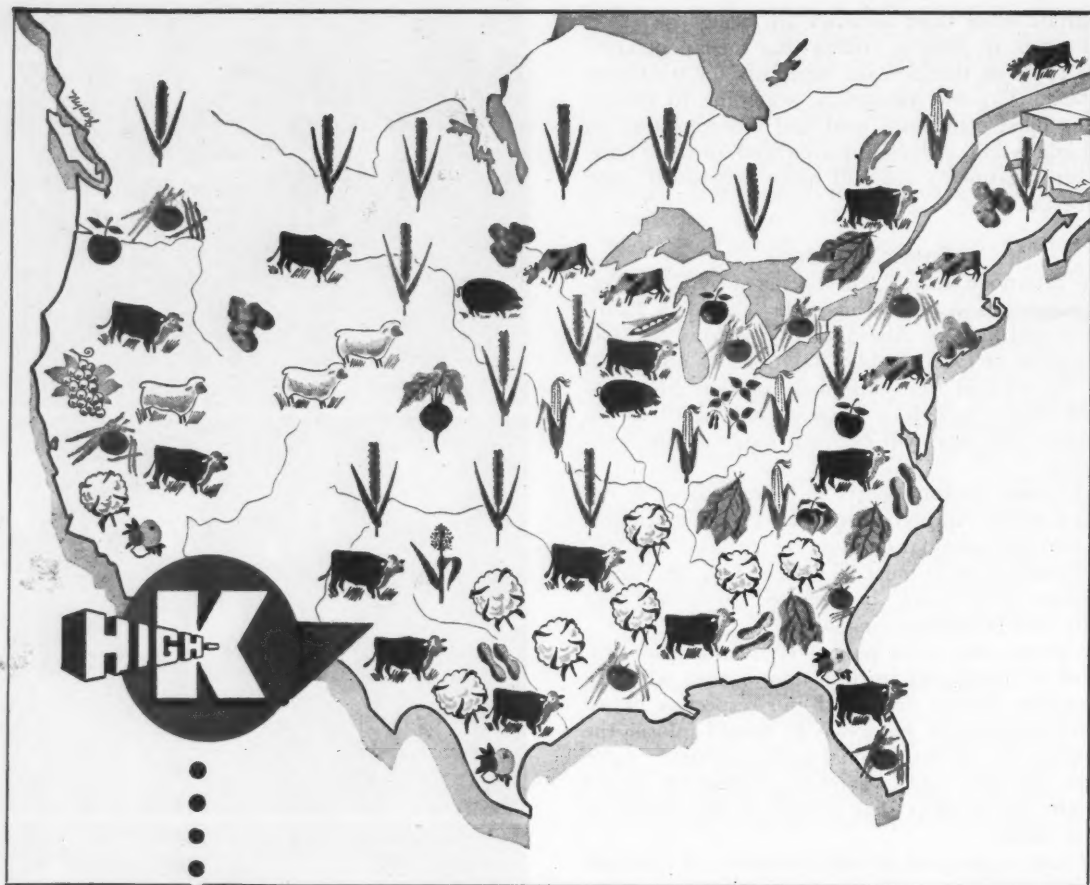
Participating in the panel were Drs. H. E. Grey, A. P. Arnason and J. J. Fettes and W. A. Ross, G. G. Dustan and D. G. Peterson of Science Serv., Canada Ag. Dept.

J. H. D. Ross, Canadian Industries; J. V. Miller, Atlas Powder Co.; A. H. Carter, Sherwin-Williams Co., and John Cowling, Natural Products Corp. meet in the Royal York.

J. A. Oakley, S. B. Penick & Co., and G. E. Worth, Pestroy Co., talk with P. A. Novikoff, Canadian Industries.

Mrs. H. L. Woudhuysen, New York, chats with Mrs. J. H. Berkley, whose husband is with Canada's Research dept.





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## Improved Brush and Weed Killers from Thompson Chemicals

# Broad Spectrum Herbicides

By Harold Hartogensis

**T**HE use of 2,4-D and 2,4,5-T for brush and weed control is about eight years old. The possibilities of their use originated during the war when it was suggested they be added to Uncle Sam's arsenal of fighting weapons. It was thought that air spraying Nazi crop lands might bring hunger and famine to the Reich and beat Der Feuhrer to his knees. Fortunately this was never attempted.

### T & D

During the post war years "T" and "D" were made the benign instruments of agriculture and industry. Millions of acres have been cleared of undesirable timber, brush and weeds, and millions of miles of right of way have been maintained through the use of these chemicals.

Although only a handful of firms are basic producers of "T" and "D", a natural development has been the spread of a host of misleading information.

"This formula will kill this." "This formula will kill that and that but not this." "Dilute with umph parts oil and water but spray only after a rain." "Wait until the ground is warm and moist." "Do it this way." "Do it that way."

One result of all this has been that many agriculturists rather than hazard poor results, or fearful that spraying presents too many pitfalls, either ignore the advan-

tages of chemical spray or else contract their work with experienced custom sprayers. This latter practice, incidentally, is often justified for many reasons.

Many users, particularly among the utilities, attempted to do their own research, to develop for themselves combinations of "T" and "D" to meet what they believed were their own exclusive needs.

### Volatility

Low volatile became a catch-all of convenience, adding to the welter of confusion on volatility. One



Tractor spraying, an excellent method which is used for reaching areas inaccessible to spray trucks.

much touted formula claimed it was safe and low volatile because its vapors failed to kill a tomato plant under a bell jar. Subsequent tests by a USDA field office indicated that this ester failed to kill the tomato plant not because of its low volatility but because of its low herbicidal activity. It not only didn't kill the tomato plant

Basal bark treatment for killing stumps and trees at any time of the year with 2, 4-D and 2, 4, 5-T.

but in actual use, tests showed it failed to kill much of anything else.

A basic producer of "T" and "D" acquired thousands of acres of land in the heavily wooded Ozark area running from Arkansas into Missouri. It set up research stations to study over a thousand individual plots of land on which herbicides of various properties and dilutions were sprayed by many methods and techniques.

These tests were conducted over a three year period to find a common denominator, or broad spectrum herbicide.

The company, Thompson Chemicals Corp., reports that it has been very successful in its research.

### Broad Spectrum Herbicides

Company research workers have isolated a controlled volatile ester which, under relatively uniform methods of application, will kill just about every species of woody growth, including hard woods, brush and weeds with the exception of the conifers.

These broad spectrum herbicides require no great technical skill of application. "Mix and spray as directed" tells the story. They can be applied as foliage spray at any time from full leaf to just prior to the first heavy frost. For basal bark application, they are good twelve months in the year.



The 2,4,5-T may be used alone for basal bark work or mixed in equal parts of 2,4-D. It is slightly more efficient by itself but the cost is somewhat higher. The addition of oil to the spray mixture improves the kill efficiency on woody plants but any cheap oil will suffice. There is no advantage in using expensive oils of high aromaticity.

Hickory has a reputation for being difficult to control. Although it defoliated slowly, the broad spectrum "D" and "T" proved highly lethal with an excellent percentage of kill. Wafer elm, although it defoliated rapidly, had a lower, although very satisfactory percentage of kill.

Competent researchers now believe that plant kill follows translocation very rapidly and may be measured in minutes and hours rather than days and weeks. There is no relationship between defoliation and kill. Trees sprayed in May and June will often defoliate, then shoot out abnormal leaves or "feather." The tree, despite this apparent show of life, can be considered as killed and will prove dead the following spring. Similarly, large trees given a winter basal treatment, may leaf out in mid-summer but show no sign of life the following spring.

Chemicals applied above the basal portion of the tree are wasted. Trees given such treatment, but with the basal portion spared, were not killed although the tops of the trees were blighted.

Foliage spraying by air with broad spectrum herbicides has yielded as high as 95 per cent kill of deciduous species. 85 per cent control borders on the lower limits.

#### Spray Technique

With broad spectrum application, the techniques are reasonably simple. Air application should be made during periods of low wind velocity, preferably five miles per hour or less. Ground thermals should be avoided. Early morning or late afternoon offer the best flying periods as a rule. Working pressure of the spray tank should be under 20 lbs. The nozzles should be of the type which deliver a medium large droplet with all hose connections and outlets checked to assure against leakage. Good flag work is very important

to prevent overshooting the boundaries of the area to be controlled.

Application of five gallons of total mixture per acre appears to be adequate for even the heaviest cover.

For ground foliage application, fence rows, rights of ways, strips and limited areas, medium and lower pressure pieces of equipment are preferable. Tractor boom sprayers are highly efficient on fairly even terrain where the brush is low growing.

The tractor single jet sprayer, because it is mobile and compact, can be used in rough terrain. The equipment is inexpensive and can be mounted on any tractor with a power take off pump. It may be dismounted in the field for spot control.

Knapsack sprayers lend themselves to spot control, for limited spreads of low brush and for basal application, regardless of size of tree. Basal stem work is far more efficient and less costly than has hitherto been believed.

Basal stems need not be frilled. Wetting the tops of stumps is a waste of chemicals. However, the entire perimeter of the lower 18 inches of the stump or tree, including all exposed roots, should be well-soaked to run-off.

Creeping agents added to the mixture, usually by the manufacturer, increase the killing power of the "D" and "T" herbicides. They overcome the hard water hazard and deliver increased translocation and better coverage. ♦

## Broad Spectrum Herbicide Application Tables

### Air Foliage Application

2, 4-D & 2, 4, 5-T (equal parts) 3 qts.	Cheap Oil 4 1/4 gallons or 1 gallon plus 3 1/4 gallons of water
Spray 5 gallons per acre.	

### High Volume—High Pressure Ground Application

2, 4-D & 2, 4, 5-T (equal parts) 3 qts.	Cheap Oil 5 gallons	Water 95 gallons
Spray Heavy Brush—100 gallons per acre.		
Medium Brush— 65 gallons per acre.		
Light Brush — 35 gallons per acre.		

### Tractor Boom—Tractor Single Jet—Knapsack Spray

2, 4-D plus 2, 4, 5-T (equal parts) cheap oil water	Heavy Brush 3 qts. 1 gal. 8 1/4 gal.	Med. Brush 2 qts. 1 gal. 8 1/2 gal.	Light Brush 1 qt. 1 gal. 8 3/4 gal.
Spray 10 gallons per acre.			

### Basal Stem

2, 4, 5-T cheap oil	3 gallons 97 gallons
or	
2, 4, 5-T plus 2, 4-D cheap oil	4 gallons 96 gallons

**APFC Head Reviews  
Current Development,  
Sees Bright Future  
for Fertilizer Industry**

# Fertilizer Production Facilities

**By Paul T. Truitt**

*President  
American Plant Food  
Council, Inc.*

**Y**OUR chairman of the Agronomy Group, Dr. Smith of Kansas State College, suggested that my remarks might take the form of a review of fertilizer production facilities. And then, as has often been my experience with college professors, he proceeded to ask me a number of questions, some of which I cannot answer. Of course, I have an advantage over my audience, because you don't know just how much Dr. Smith asked that I can't answer.

He suggested that such a review "should aid agronomists in formulating their recommendations and it should aid the industry in appraising their own problems."

Naturally, we should like to be as helpful as possible to the agronomists who conduct the experiments, who measure the results and who write the prescriptions—and to the industry which builds the

plants, produces the fertilizers and fills the prescriptions.

Already, the agronomists have recommended, by and large, about

perment station recommendations fully and uniformly used by all farmers.

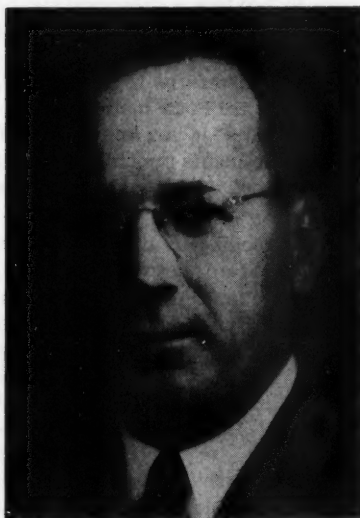
To be sure, if recommendations are ever so used, the industry will have to expand extensively, as it has always done, to meet the additional demand.

Fertilizer manufacturers are always interested in suggestions the agronomists have for the industry, and I am glad that we shall hear Dr. Ohlrogge on that general subject this afternoon.

Just now, because our industry has expanded production, because more fertilizer is available than has ever been used before and because the fall half of the present crop year has been somewhat slack—I suggest that agronomists, as well as industry people, do their utmost to carry the advantages of sound fertilizer use practices to each and every farmer in the Nation.

I suggest—even urge—such action, not in the interest of increasing food and fiber surpluses, but in the interest of more efficient farming. Not all citizens realize that despite temporary surpluses in some foods we must increase the total output of food each year over the preceding year, if we are to eat as well in the future as we do now.

A process of expansion through readjustments in acres and crops is now under way and is likely to continue for some time. In the future, I think we shall see an increasing



**Paul T. Truitt**

twice the amount of fertilizers we have seen used in any one year.

## **New High**

Already, the industry has reached a new high for fourteen consecutive years, and in this crop year is prepared to produce about 11 per cent greater tonnage of plant food than was used last year.

Therefore, we—the agronomists and the industry—would seem to have at least one problem in common, namely, how to get state ex-

*Presented before the Agronomists-Industry Meeting sponsored by the Middle West Soil Improvement Committee, Chicago, Ill., Feb. 19, 1954. (For an account of the meeting, see page 43.)*

use of fertilizers and lime and a growing, but diversified, output of food and fiber.

### Investments

Dr. Smith suggested my first discussion of fertilizer production facilities be in terms of money. How much money is invested in the Nation's fertilizer industry? And, how is the total distributed among various types of production, that is between nitrogen, phosphate and potash. These were the first two questions.

Let me say here that all the figures I shall give you are from the Departments of Agriculture and Commerce, or from published trade sources. None of this information is original with the American Plant Food Council, because the council conducts no surveys and collects no statistics.

Before talking in terms of money invested, I should state that there are about 935 fertilizer manufacturing companies in the United States, its possessions and in Canada. These companies operate 1198 plants in the United States, plus 67 plants in our possessions and in Canada, making a total of 1265 plants.

About 10 per cent of the companies—90 in number—operate multiple plants. Of these 90 companies

- 44 operate 2 plants
- 11 operate 3 plants
- 10 operate 4 plants
- 4 operate 5 plants
- 3 operate 6 plants
- 3 operate 7 plants
- 2 operate 8 plants
- 2 operate 9 plants

then, 11 operate 10 or more plants each, the number ranging from 10 to 62 plants.

The remaining 845 companies operate only one plant each.

Geographically, these plants are distributed to serve the farming regions of the Nation in 47 states. New Hampshire is the only state in which there is no fertilizer manufacturer.

### Value of Industry

As of 1951, when the fertilizer expansion program—now fully subscribed and well along towards completion—was being laid out, the USDA estimated the reproduc-

tion cost of facilities then employed in the manufacture of fertilizers at \$834,000,000. The 1951 depreciated value of these same facilities was reckoned at \$639,000,000.

Estimated cost of new facilities authorized under the present expansion program amounts to approximately \$520,000,000. This figure added to the 1951 reproduction cost will give the fertilizer industry a value of approximately \$1,350,000,000 when the presently authorized construction has been completed.

At this point, an interesting fact appears, namely, the capital requirements of the fertilizer industry are relatively high. On the average, approximately \$1¼ to \$1½ in plant investment is required for each \$1 in annual sales expected.

### Economy in Fertilizer

Despite this fact, fertilizers have gone up in price less than any other major component a farmer uses to produce a crop—except to the extent interest on borrowed money is a cost in making a crop. In terms of returns to the farmer, fertilizers are even more economical, because—as you know—few, if any, investments the farmer makes return more per dollar spent than he gets from fertilizers.

The second part of the question—the split-up between nitrogen, phosphate and potash—is harder to answer. The amount of the total investment in each of the three major plant food elements is estimated to be about \$980,000,000 for nitrogen, \$270,000,000 for phosphates and \$100,000,000 for potash. I point out that these figures are estimates made from data on replacement cost of plants, as of 1951, plus reported cost of assisted and unassisted expansion.

### New Developments

Speaking further—but briefly—in terms of fertilizer production facilities, I would expect this audience has a good idea of the types and kinds of plants making up our industry. There are many older plants still in operation. However, the rapid growth of the industry has provided opportunity for the development and application of newer processes, improved operating techniques, more modern ma-

chinery, "push-button" labor-saving plants, a variety of newer products and methods of distribution.

Today, there are few large industries which have grown as fast in the past decade, and which can expect any more rapid growth over the next few years, than the fertilizer industry. Such growth doubtless will reveal a variety of still newer plant facilities and end products. With this systematic growth will come improved technology and a higher degree of efficiency for the future. Such a course of events will better serve the farmers, the general public, and the over-all economy of the Nation.

Dr. Smith asked, "What are the production possibilities for the future?" He stated—and I agree—that this seems the most significant point of all.

Dr. Smith also said, "A lot of interest exists insofar as new materials like urea, ammonium phosphate and nitraphosphate are concerned."

I think I can best answer these comments by reviewing the expansion program in terms of nitrogen, phosphate and potash.

### Nitrogen Program

The calendar year base production on which the nitrogen expansion program was set up was 1,639,000 short tons. This was made up of 1,399,000 tons of synthetic, 200,000 tons of by-product and 40,000 tons of natural organics. These figures do not include imports in any form.

The expansion goal was set at 2,930,000 tons, to be available in 1955. It was planned that 2,185,000 tons of this amount would be available for agriculture. The net expansion required to meet the 1955 goal was 1,291,000 tons, according to my recent check of figures with the Chemical section of the Business and Defense Services Administration of the U. S. Department of Commerce.

Capacity is completed or is under construction to produce 1,266,900 short tons of nitrogen.

To this should be added other potential capacity not yet under construction, which is included in

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the nitraphosphate goal of 190,300 tons per year.

Thus, the nitrogen program has officially been completed and declared to be closed.

### New N Goal

In passing, I may note that the USDA has just requested a re-opening and further expansion of the nitrogen program for an additional 570,000 tons capacity to come in by January 1, 1957—about three-fifths of this amount would be for agriculture's uses.

The fulfillment of the nitrogen program appears about as follows:

295,300 tons came in during  
1951-52  
208,900 tons during 1953  
762,700 tons in 1954

Comment in trade circles indicates agriculture will get all of its planned share of this new production, so that—assuming the present export-import balance—agriculture will have something over two million tons of nitrogen available this crop year. Such an increase represents 11 per cent over the 1,800,000 tons used last year. It is estimated that the split-up between solid and liquid forms of nitrogen will be 60-40, respectively, as compared with 62-38 last year.

Although it cannot be stated positively, it is expected that all the new production in the present program will be in and available during the 1954-55 crop year. Some portion may come in as late as the 1955-56 crop year, but the amount should be small.

### P<sub>2</sub>O<sub>5</sub> Expansion

The 1955 goal for the expansion of P<sub>2</sub>O<sub>5</sub> was set at a total of 3,550,000 short tons. Considering base period output of P<sub>2</sub>O<sub>5</sub>, capacity to produce 1,300,000 additional tons was required.

Currently, projects completed, under construction and planned account for capacity for 1,154,500 tons. The fact that projects completed or under construction account for 854,700 tons, and projects not under construction account for 299,800 tons, may bear on the maturity rate of this program. The majority of this tonnage—948,000

tons—is expansion assisted by tax amortization certificates; 206,500 tons is unassisted.

In terms of end product, the 1,154,500 tons projected is expected to be divided about as follows:

	TONS
Triple superphosphate...	558,700
Ammonium phosphate...	105,900
Nitraphosphates.....	199,500
Normal superphosphate..	148,600
Miscellaneous.....	141,800
Total.....	1,154,500

In terms of maturity, capacity to produce 554,400 tons was completed before January 1, 1954. Capacity to produce 314,900 tons is scheduled to be completed during 1954. The balance of 285,200 tons is due after January 1, 1955, but during that year.

USDA has estimated the available supply of phosphatic materials, basis P<sub>2</sub>O<sub>5</sub>, will amount to 2,696,000 tons, which will exceed last year's 2,410,000 tons by 12 per cent. A considerable share of this increase will be in the form of concentrated superphosphate.

### Potash Goals

In considering potash, it is comforting to note that the American producers have freed our farmers from dependence on foreign sources which, in times past, have been cut off by war. The 1955 goal for potash was set at 2,185,000 tons K<sub>2</sub>O. The industry has expanded by adding to existing facilities and by new companies entering the business.

Current production approximates 2,000,000 tons annually, as compared with 1,735,000 tons available in 1952-53. Thus, farmers may expect up to 15 per cent more domestic potash this year than was on hand last year. This will come largely in the form of 60 per cent muriate. The popularity of lower grade muriate and manure salts has dropped very sharply. On the other hand, the sulfate forms may be expected to increase in popularity. However, their rate of increase in popularity has not been as fast as that of 60 per cent muriate.

Summing up the immediate future outlook, we can say that, for

the present, the rate of maturity of the expansion programs is satisfactory and, in fact, for all practical purposes, can be considered as completed. Increased supplies available to farmers this crop year are expected to be about 11 per cent more nitrogen, 12 per cent more P<sub>2</sub>O<sub>5</sub> and about 15 per cent more K<sub>2</sub>O.

We know of no supply problem with respect to minor elements.

What shall we say of the long-term future in terms of increasing supplies? Having in mind the Chinese proverb which says, "Nothing is more foolish than prophecy"—but being willing to take some risk—I would assert that the fertilizer industry will continue to develop better and more modern plants, better end products, more efficient methods of distribution and have on hand all the fertilizer the farmers will use in years to come.

### Common Problem

I should like to conclude by coming back to the common problem which we in industry share with you in the educational institutions and experiment stations, namely, what can we do to get farmers to follow your recommendations to use fertilizers fully and wisely, and thus become more efficient and prosperous farmers?

Education and promotion in this direction is a never-ending job. Let us all keep at it—and let us not allow the true perspective of the future to be altered by temporary ups-and-downs and by admittedly troublesome surpluses.

### More Farm Output

The real fact of the matter is that to meet growing demands, total agricultural output must go up, year by year, for the foreseeable future. This will necessitate an ever-increasing efficiency in agriculture.

At the same time, agriculture must become more diversified, because we cannot afford to go on producing surpluses in some crops.

In my view, the future is not assured as easy, but it is assured as bright. More fertilizers will be needed, produced, and used—all to the benefit of consumers and farmers alike. ♦

Nearly 500 Agronomists  
and Industry Reps. Attend

## Midwest Soil Improvement Meet

**H**OW soil tests can be used to help farmers produce higher per-acre yields through more efficient fertilizer use was described in research reports presented at the annual Joint Meeting of Midwestern college agronomists with representatives of the fertilizer industry, at the Palmer House, Chicago, Feb. 19.

Best attended in the history of these meetings sponsored by the Middle West Soil Improvement Committee, the program drew nearly 500 to the hotel's Red Lacquer room. These included personnel from more than 100 companies and organizations, plus 13 state colleges and agricultural experiment stations.

Dr. Floyd W. Smith, Kansas State College, was chairman. Research reports were presented by G. E. Smith, University of Missouri; John Hanway, Iowa State College; K. C. Berger, University of Wisconsin; Paul M. Burson, University of Minnesota; E. H. Tyner, University of Illinois and H. E. Myers, Kansas State College. P. T. Truitt, president of the American Plant Food Council, spoke for the fertilizer industry.

### Presidential Welcome

H. S. Vorhes, president of the MWSIC, welcomed the agronomists. He cited the benefits resulting to both the soils men and the fertilizer industry from these meetings. Fertilizer men, he said, get firsthand information on the latest college research. Agronomists from each of the states exchange ideas and discuss plans for cooperation in regional research. Both fertilizer industry and soils men develop a closer understanding of the problems affecting each, and can work cooperatively in helping promote better soils management and more efficient crop production by farmers.

George E. Smith, University of Missouri, opened the program with a discussion of "Fundamental Principles Involved in Soil Testing."

"Early experiments with fertilizer in the Middle West," said Smith, "were designed to determine the minimum amount of fertilizer needed to give profitable yield increases. Recent experiments have shown that when sufficient plant nutrients are added, low-fertility soils can be made to produce top yields."

Russell Coleman of NFA talks with H. E. Myers, Kansas State College, and P. T. Truitt, APFC, who were speakers.

APRIL, 1954

Smith said that soil tests now can show the nutrient reserves in individual soils and help in calculating the kinds and amounts of nutrients needed to build the soils to high crop production. These tests, he said, are not perfect, but if good soils samples are properly analyzed, they can give information which helps develop an efficient fertilization program.

"The weakest link in soil testing," he said, "is failure to obtain representative soil samples. Laboratory procedures are generally more accurate than are sampling methods. There is little benefit in improving and refining laboratory methods unless soil sampling errors are reduced."

### Correlating Information With Response •

John Hanway, Iowa State College, reported on "Correlating Soil Test Information with Crop Response."

First step in an adequate correlation of soil tests and crop response for different soils and different crops, he said, is evaluating the soil test on the soils to be tested.

Discussing research experience in Iowa, Hanway said that greenhouse experiments should be made, including representative samples of soils tested. Field fertilizer experiments should also be conducted to obtain response data on soils tested and crops for which fertilizer recommendations are made. There should be a sufficient number of field experiments to cover the range of soil test values, he said. Experiments should be conducted over a period of years, applying different rates of the nutrients needed.





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Hanway said that if only surface soils are to be tested, the nutrient availability in subsoils must also be evaluated. Other factors which might influence crop response from fertilizer and yet not influence soil test results, he said, are the soil's physical condition, drainage, pH (neutral, acid or alkali), minerals in the soil and organic matter content. Soil test results, too, should be correlated with the yield increase obtained from different rates of fertilizer application on each group of soils for each crop.

K. C. Berger, University of Wisconsin, reported that fertilizer prescriptions based on soil tests are helping many Wisconsin farmers grow 100-bushel corn yields.

Berger reported that farmers like the fertilizer prescriptions and follow them more closely than would be the case with a more generalized fertilizer recommendation.

### Minnesota Was First

Paul M. Burson, University of Minnesota, declared that Minnesota was the first state to have the fertilizer industry, and the local fertilizer, feed and seed dealers, elevators and creameries serve as soil sample collection depots throughout the various counties for the state soil testing laboratory.

"Through the fertilizer industry," said Burson, "the dealers were asked to assist the county agent as local leaders by operating soil sample collection agencies. The county agent provides the cooperating dealers with instruction forms, information sheets, soil sample containers and shipping containers for the use of farmers. The farmer can either send his own samples to the laboratory, or take them back to the dealer depot, where the dealer will send them in to the state laboratory for testing.

"The tests made on each sample of soil include: pH, available potash, available phosphate, indication of organic matter level and general textural differences.

"From the tests and information given by the farmer on the information sheet, along with the years of research on how fertilizers function in the soil and the nutrient requirements of different crops, recommendations are given for liming if necessary, fertilization as to grades and rates per acre and other soil management practices as may be necessary.

APRIL, 1954



R. L. Cook, Michigan State College; Z. H. Beers, executive secretary, MWSIC, and A. J. Ohrogge, Purdue University.

"When the soil test reports and recommendations are received by the farmer, he takes them to his fertilizer dealer and the two of them determine the amount of fertilizer needed for the different crops throughout the season.

"In Minnesota, the fertilizer grades as furnished by the industry are grouped into ratios on a form sheet. When a recommendation is given a farmer, he is advised the amount to apply per acre for each grade in the ratio. In this way there is no discrimination between fertilizer grades in the same ratio.

"To help the fertilizer dealer in this program, the county agent and the extension soils specialist hold fertilizer dealer meetings to bring to the dealers the latest information on soils, fertilizer and testing. This helps the dealer become a better leader in his community. He can help farmers because the dealer, in most cases, is the last man the farmer sees before he goes into the field in the spring."

Burson said that while all soil tests are made at the University of Minnesota farm at St. Paul, in 17 counties either the county agent or assistant county agent in soil conservation makes the recommendations in his own county.

### Time for Application

In a report entitled "Principles Involved in Selecting Time for Application of Fertilizer," Edward H. Tyner, University of Illinois, pointed out that in crop production there is competition between the roots of the plant and the soil itself. This competition, he said, comes mainly from two sources, the colloidal phase and the soil's population of microbes or organisms.

In the colloidal phase, a literal "hide-and-seek" game exists in the soil between the root system of a crop and any plant food, such as phosphorus and potash which, through chemical reactions, is attached in relatively insoluble form on soil colloidal surfaces.

The problem in fertilization, he said, becomes one of building up the available phosphate and potash supply of a soil to the point where no matter where the root goes, there is always a sufficient supply of nutrients. Or it involves placing these nutrients in bands with a minimum of soil contact in a position where plant roots quickly find the applied phosphorus and potash.



Malcolm McVicker, NFA; M. K. Miller, Tennessee Corp., and J. R. Taylor, Grand River Chem. Div., Deere & Co.



Albert Woods, Potash Co. of America; L. A. Krebs, Baugh & Sons Co., and C. E. Littlejohn, U.S. Potash Company.

Tyner said that active competition for available nitrogen may occur between a growing crop and the soil's microbial population when crop residues such as straw, sod-bound grass sods, etc., are plowed down. In this case the placement of nitrogen is of less importance than is the amount of nitrogen applied and the time of application. Generally, he said, about 30 pounds per acre of actual nitrogen is sufficient to satisfy the needs of soils organisms in rotting organic matter.

Growing plants, he said, usually demand the greater proportion of their nitrogen just before and just after the reproductive stage. Nitrogen, therefore, should be either plowed under or sidedressed early to assure its being in the root zone at the critical reproductive period.

Paul T. Truitt, president of the American Plant Food Council, in a report on "Fertilizer Production Facilities," said that the agronomists and the fertilizer industry have at least one problem in common: How to get the state experiment station fertilizer recommendations fully and uniformly used by all farmers.

"In my view, the future is not assured as easy, but is assured as bright. More fertilizer will be needed,



G. T. Newnam, Smith-Douglass Co.; J. R. Sargent, Federal Chemical Co., and J. D. Zigler, Int. Min. & Chem.

produced and used—all to the benefit of consumers and farmers alike," Truitt said.

In a discussion on "What Does the Future Offer the Fertilizer Industry?", Harold E. Myers, Kansas Agricultural Experiment Station, declared that the industry will have a greatly enlarged opportunity to be of service to the consuming public. If the industry accepts the challenge, he said, the United States should continue to enjoy economical production of high quality food in abundance.

#### Fertilizer Recommendations

A. J. Ohlrogge, of Purdue University, presented the agronomists' recommendations for minimum fertilizer grades and ratios for the 1954-55 crop year in the 13 Corn Belt States represented at the meeting.

A question and answer session was the program's concluding feature, with a panel of agronomists answering questions propounded by industry men.

On three succeeding days before the Joint Meeting, agronomists attended sessions of the North Central Soils Research Committee at the Palmer House in Chicago. G. W. Volk, Ohio State University, was chairman. Soils extension men from the 13 states came to Chicago for a meeting on February 18, and stayed on for sessions of the Joint Meeting of the agronomists and industry representatives.

At the conclusion of the Joint Meeting's program, Chairman Floyd W. Smith extended the agronomists' thanks to the Middle West Soil Improvement Committee and to Z. H. Beers, its executive secretary, for sponsoring the meeting and bringing the college men together.

For several days preceding the meeting, the Middle West Soil Improvement Committee, in cooperation with radio stations WLS and WGN in Chicago, arranged for 18 broadcasts in which the agronomists told farm audiences about soil testing, more efficient crop production through fertilizer use and methods for increasing corn and wheat yields per acre. These programs included "live" appearances as well as transcriptions cut for later broadcasting. ♦

# Soil Tests and Fertilizer Prescriptions

By K. C. Berger

Department of Soils  
University of Wisconsin

**I**N WRITING a fertilizer prescription based on soil tests, one should take into account not only the test results, but also the crop to be grown, yield expected and amounts of nutrients taken up by such a crop. It is generally known that during one growing season a crop cannot take up all of the available nutrients found by test in a soil, or applied as fertilizer or manure.

On the basis of experience and data available, it is estimated that a corn, sugar beet or potato crop, during one growing season, can absorb nutrients from soil, manure and fertilizers as indicated in table 1.

## Nutrient Sources

A 100-bushel crop of corn requires 150 pounds of nitrogen and, on the basis of estimate shown in table 1, it can get only 40 per cent or 80 pounds from a soil which contains say 200 pounds per acre of available nitrogen. The differ-

ence, namely 70 pounds, will have to come from manure and/or fertilizer. In addition, because what is applied is only partially obtainable, as shown in the table, appropriate calculations have to be



K. C. Berger

made in writing the fertilizer prescription for nitrogen, and similarly for phosphorus and potassium.

## Truog-Hellige Tests

Estimates made on the amounts of nitrogen, phosphorus and potassium the crop can obtain in one growing season are based on the Truog-Hellige short tests for these elements. The test for available nitrogen is relatively new and

measures amounts of nitrogen in a soil which will become available for crop growth during the growing season. These amounts exceed the amounts of nitrogen present as nitrates and ammonia at any one time of sampling.

Crop composition varies considerably, but for purposes of these calculations, the average amounts of plant foods contained in the tops and roots of the crop at the stage of maximum uptake suffices. The amounts of nitrogen, phosphorus and potassium used for the three crops under consideration are shown in table 2.

## Calculations

The calculations involved for writing the fertilizer prescription for any particular field are relatively simple as can be seen in the following example, where a prescription for a 100 bushel yield of corn is given.

Suppose the tests on a sample of soil reveal pounds per acre of available nutrients as follows:

Nitrogen—200 (N)

Phosphorus—25 (P) or 60 when converted to fertilizer phosphate ( $P_2O_5$ )

Potassium—100 (K) or 120 when converted to fertilizer potash ( $K_2O$ )

Enter the results of the soil test figures for nitrogen (N), phosphate ( $P_2O_5$ ) and potash ( $K_2O$ ) in a tabulation as shown in table 3, and then calculate (using percentages in table 1.) and enter in the tabu-

*Presented before the Agronomists-Industry Meeting sponsored by the Middle West Soil Improvement Committee, Chicago, Ill., Feb. 19, 1954. (For an account of the meeting, see page 43.)*

lation the amounts the crops will actually get from the soil. Then estimate and list the amounts of manure and/or fertilizer which appear to be needed to give the approximate amounts of nutrients required for the 100-bushel yield.

Figures for nutrients thus supplied and respective amounts using percentages in the table that the first crop can get are next entered. The amounts the crop can get are then totalled, and if the totals are close to what is needed, the job of writing the prescription or formula

for the 100-bushel crop is completed.

#### Sample Analysis

If the totals vary considerably, make adjustments in amounts and kinds of fertilizer by means of the cut-and-try method. In the example given, the totals for nitrogen and phosphorus are nearly on the "head." For potassium the total is somewhat high, but this will be all to the good for the alfalfa (a potash lover) next year.

In 1952 soil samples were collected from 173 fields in 10 southern Wisconsin counties, the soils analyzed for pH, and available nitrogen, phosphorus and potassium. Fertilizer prescriptions then were written for individual fields using the method described above. In addition to soil test results, the amount of manure applied and crop to be plowed under were taken into consideration.

It was recommended that corn be drilled or hill dropped so as to have 17,000 to 20,000 plants per

**Table 1. Estimated percentages of the amounts of nitrogen, phosphorus and potassium present in available forms in soils and applied as manure and fertilizer that may be obtained by a crop like corn during one season.**

Sources of N, P, and K	Percentages obtained by crop during one season		
	N	P	K
Soil (available present).....	40	40	40
Manure (total present).....	30	30	50
Fertilizer (available present).....	60	30	50

**Table 2. Pounds per acre of nitrogen, phosphorus and potassium in corn, sugar beets and potatoes at yields indicated**

Crop	Acre yield	Pounds per acre in crop		
		Nitrogen (N)	Fertilizer phosphate (P <sub>2</sub> O <sub>5</sub> )	Potash (K <sub>2</sub> O)
Corn.....	100 bushels	150	60	120
Sugar beets.....	20 tons	155	60	195
Potatoes.....	500 bushels	210	70	290

**Table 3. Formulation of fertilizer prescription on basis of soil tests and manure applied for 100-bushel corn yield.**

Source of Nutrient Element	Lbs. Nitrogen		Lbs. Phosphate		Lbs. Potash	
	Present	Crop Gets	Present	Crop Gets	Present	Crop Gets
Soil (available).....	200	40% or 80	60	40% or 24	120	40% or 48
10 tons manure.....	100	30% or 30	50	30% or 15	100	50% or 50
600 lbs. 10-10-10.....	60	60% or 36	60	30% or 18	60	50% or 30
400 lbs. 3-12-12....	12	60% or 7	48	30% or 14	48	50% or 24
Totals crop may get.....	—	153	—	71	—	152
Totals needed.....	—	150	—	60	—	120

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**Table 4. Yields of corn in 1952 fertilized in accordance with prescriptions for 100-bushel yield. Arranged according to population.**

Yield ranges Bu. per acre	No. fields in each range	Average yield for each range bushels per acre	Average corn population stalks per acre
Under 100.....	15	92	13,370
100 to 110.....	18	106	13,790
110 to 120.....	31	116	14,280
120 to 130.....	40	124	15,220
130 to 140.....	38	134	15,420
140 to 150.....	25	144	15,990
Over 150.....	6	155	16,560
Total no. fields—173		Av. all fields—124	

**Table 5. Yields of corn in 1953 fertilized in accordance with prescription for 100-bushel yield. Arranged according to yields and population.**

Yield ranges Bu. per acre	No. fields in each range	Average yield for each range Bushels per acre	Average corn population stalks per acre	Average ear weight in pounds
Under 100.....	332	85.8	13,900	.432
100 to 110.....	166	105.1	14,960	.492
110 to 120.....	128	114.6	15,260	.526
120 to 130.....	73	124.5	15,880	.549
130 to 140.....	41	134.0	16,640	.564
140 to 150.....	12	146.2	17,050	.600
Over 150.....	8	159.8	17,850	.627
Total no. fields—765		Av. all fields—102.2		

acre. It also was prescribed that cultivation be shallow with only one or two cultivations to avoid root pruning.

#### Yield Results

Yield results were obtained by harvesting four 50 foot rows, one in each quarter of the field, and weighing the ears. A composite sample of 12 ears was taken for moisture determination, and dried in the oven. Yields then were calculated to a 15 per cent moisture basis. Yields were taken from 173 fields on 162 farms and the yield data are given in table 4.

The growing conditions in 1952 were ideal as evidenced by an average yield in the "100 Bushel Corn Adventure" of 124 bushels per acre. The state average corn yield for 1952 was 58 bushels, about 14 bushels higher than the 10 year average.

The data in table 4 show in a striking manner that the higher yields are associated directly with the higher populations.

In 1953, prescriptions were written for 100 bushels of corn for about 1500 individual fields in 39 counties. In addition, prescriptions for growing 20 tons of sugar beets were made on about 480 fields. For sugar beets, besides recommendations for nitrogen phosphorus and potassium, recommendations for the use of sodium and boron were also given as well as methods of planting and cultivating.

Results for corn yields obtained in 1953 are given in table 5.

#### 1953 Less Favorable

The growing season in 1953 was not as favorable as it was in 1952, and because recommendations were made on a statewide basis includ-

ing results from counties in the northern part of the state where the growing season is relatively short, the average yield was somewhat lower in 1953.

#### Sugar Beet Tests

Tabulation of sugar beet yields has not been completed, but results are not as favorable as those for corn. In general, sugar beet stands were very poor, which with abnormally low rainfall in September and October resulted in poor yields.

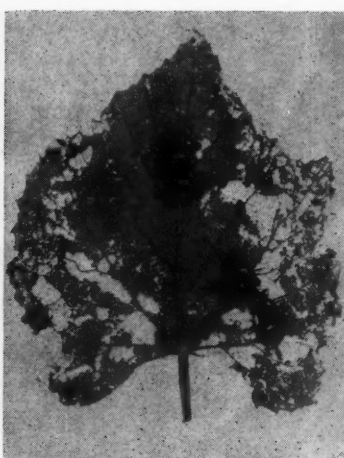
It has been the experience in these two years that farmers greatly admire this type of recommendation and follow it more closely than they do a more generalized fertilizer recommendation. They are interested specifically in their own particular field and the results show that this method of recommendation is successful. ♦



Pine Bark Aphid



Bagworm



Jap Beetle



Oyster Shell Scale

Control These and Other Garden Pests With—

# Malathion Garden Formulations

**H**OME gardening has become a major avocation during the past few years, and supplying the gardener with his fertilizer, spray and dust requirements has grown into a good-sized business.

This home gardener, as pointed out by R. G. Tousy, technical representative of American Cyanamid Co., is not an entomologist or a chemist. To combat his garden pests, he depends on prepared mixtures, of which there are a multitude on the market.

The whole problem of controlling a wide variety of insects has led to an increasing demand for a material effective over a considerable range—one that will successfully combat the different garden marauders.

Tousy feels that his company has come up with an answer to

this problem—malathion, an organic phosphate which is relatively non-toxic to warm blooded animals but which is most effective against pests ranging from aphids to mites.

## Pests Controlled

What will malathion control? Tousy names these major garden pests as examples:

**Mites.** Kills all common mite species including European red, two spotted spider, spruce, southern red, oak and willow.

**Scales.** Effective against a wide variety. Best used as a summer spray against crawler stages, it has proven toxic to both armoured and soft types including oyster shell, euonymus, cottony cushion, soft brown, pine needle. Monterey

pine, rhododendron, juniper, magnolia, Florida red, tea, various lecanium types and others.

**Aphids.** Control can be obtained on all common ornamentals.

**Mealybugs.** According to Tousy, malathion has given a spectacular cleanup of this pest of taxus, catalpa and other plants.

**Lace Bugs.** Small amounts of the insecticide have given close to 100 per cent kill.

**Leaf Miners.** Proved highly successful in 1953 trials on birch, boxwood and azalea leaf-miners.

Miscellaneous pests which can be controlled include the Japanese beetle adults, leafhoppers (rose and potato), thrips, white flies, tarnished plant bug, four-lined leaf bug, cucumber beetle, leaf rollers,



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canker worms, tent caterpillars, bag worms (all stages) and European pine shoot moth.

Malathion has been under field tests for more than three years and researchers are continuing to add to the list of pests which can be controlled.

One of the most attractive features of malathion for home garden use is the chemical's relative safety. USDA has classed it as one of the safest of insecticides to handle and its toxicity to warm blooded animals is rated less than that of DDT.

### Formulation

Malathion is known chemically as O, O-dimethyl dithiophosphate of diethyl mercaptosuccinate. Other names for the material have included malathion and compound 4049.

It is slightly (145 ppm) soluble in water, very slightly soluble in refined spray oil and miscible with many organic solvents. Both excessive moisture and pH outside the range of five to seven affect decomposition.

Basic ingredient for formulators is a malathion emulsion containing five pounds of the technical material per gallon. In addition to less concentrated emulsions, it can be formulated into dusts and wettable powders.

The usual liquid formulation is a 50 per cent emulsion. Xylene is used as a solvent and emulsifiers such as glycol 1132 are satisfactory. Label claims are based on the actual amount of malathion in any particular formulation.

### Wettable Powders

Twenty five per cent wettable powders will be available this year, produced with Kaolinite or Barden Clay type carriers or a Friarite base. Carriers for four or five per cent dusts will be the same as those for wettable powders with the addition of diatomaceous earth for increased flowability.

A folder offered by American Cyanamid at the recent garden supply trade show in New York City listed 26 domestic small package formulators with malathion products on the market. Many others are undoubtedly considering addition of the material to their product lists for, with such a wide range of applications, malathion is bound to be a top item. ♦

APRIL, 1954

## Malathion for Fly Control

**M**ALATHION is not only a versatile garden insecticide, but has also received wide acclaim as a fly killer for both home and agricultural applications. It has proven an easy material to handle, one that is very effective even on DDT resistant fly strains, and it has been accepted by USDA for fly control inside dairy barns.

Depending on the original infestation, general sanitation and the weather, one application of malathion will last from 10 to over 21 days.

A Wisconsin farmer has reported finding dead flies in his dairy barn three weeks after malathion was applied, and in Mississippi, a dairy operator has stated that effects were noticed for four weeks after use of the material.

### Application

For use in and around buildings housing domestic animals, around yards and around homes, a spray containing two gallons of malathion emulsifiable liquid in 100 gallons of water is recommended. The spray should be applied to thoroughly wet any surfaces on which flies alight or congregate including walls, ceilings, stanchions, manure piles, etc.

For a bait spray, two gallons of the emulsifiable liquid are combined with two gallons of unsulfurized molasses or corn sugar, or with 20 pounds of sugar in 100 gallons of water.

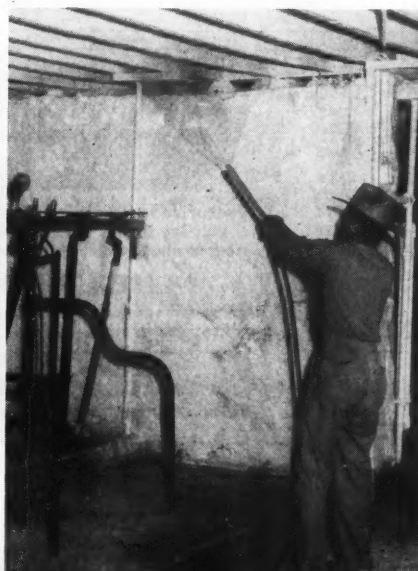
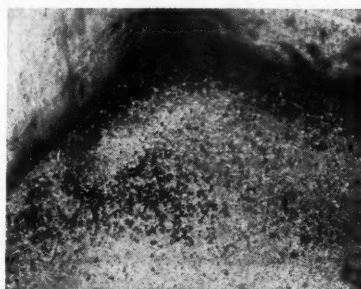
Dosages of the insecticide and sugar in excess of those recommended may give increased residual kill according to some indications but the quantity of sugar used should not exceed 50 pounds per 100 gallons water.

### 'Nuisance Problems'

An excellent example of malathion's effectiveness in solving civic nuisance problems has been the results at Lakeland, Fla. According to Don Emerson, Lakeland control director, he has never seen any thing work so effectively in eliminating the fly menace. He anticipates a complete elimination of the fly problem, in both the city dump and hog farm.

Despite the comparatively low mammalian toxicity of malathion, several precautions should be observed when using the material in fly control. Sprays should not be used in milk rooms and animals or poultry should be removed from buildings prior to treatment. Bait sprays are not for use in dwellings. ♦

Right: Applying malathion, this man wets ceilings, walls, stanchions and other places where flies congregate. Bottom: Dead flies on barn floor which dropped from a treated wall.



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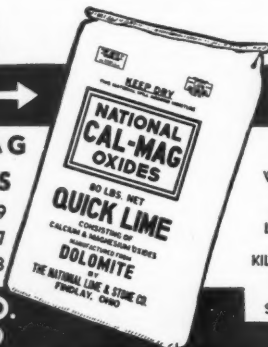
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# Progress in Fertilizer Safety

## Gornto Calls for Full Industry Participation in Safety Program

By Vernon S. Gornto

*General Chairman, Fert. Section  
National Safety Council*

AT THE Chemical section meeting of the National Safety Congress in Chicago in October, 1950, three delegates got together and discussed safety in the fertilizer industry. The men engaged in this conversation were A. B. Pettit, Davison Chemical Co.; John E. Smith, Spencer Chemical Co. and Jack Fields, Phillips Chemical Co.

As a result of the meeting, they agreed to take immediate steps to see if a Fertilizer section could be organized within the National Safety Council.

Three meetings were held that year and letters were sent out by the three men inviting representatives of other fertilizer companies to meet with them. A. B. Pettit was elected as the first general chairman, Jack Fields as vice chairman and John Smith as secretary.

### First Meeting

In October, 1951, this group held its first meeting as a part of the National Safety Congress—as a division of the Chemical section at which Fields was elected general chairman; Smith, vice chairman and the author, secretary.

A splendid program was arranged by Program Chairman John

Smith for the Congress meeting in October, 1952. At a meeting of the executive committee in December, 1951, committee chairmen were named by Fields and most of these men have served continuously and served well since their appointment.

In addition to these groups, we have a nominating committee each year with the immediate past gen-

encouragement. Without their enthusiastic support and cooperation, we could not have progressed so successfully and rapidly as we have.

In October, 1952, we made application to the Industrial division of the NSC for independent sectional status but no action was taken on it.

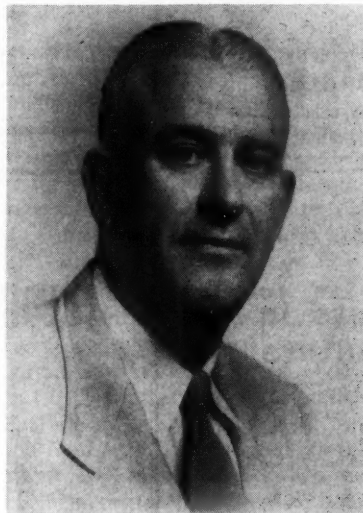
We were determined that we should not have to remain as an unwanted offspring of the Chemical section and knew we were capable of standing on our own feet. Therefore, we sent A. B. Pettit to plead our cause at the next meeting of the Industrial conference, which was held in January, 1953. A. B. was successful in selling the conference on the idea that we were sufficiently interested to be able to stand alone.

At the meeting of the Industrial conference, independent status was granted to the Fertilizer section. I have been told by some of the top executives with NSC that no other section of the organization has ever made such rapid strides or has ever reached independent sectional status as quickly as did the Fertilizer section.

At the Congress last October, I was elected general chairman and Curtis Cox, Virginia-Carolina Chemical Corp., was elected secretary.

We have 39 members on the Executive committee of the Fertilizer section. Thirteen members of this committee are elected each year, for a three-year term. We also have four honorary members.

Now—what can you do to help the officers of the Fertilizer section achieve our 1954 goals? (*Ed. Note: The 1954 goals appeared in the December issue, page 47.*) You can do much to help us achieve each



Vernon S. Gornto

eral chairman automatically serving as chairman of the group. We have other special committees appointed by the general chairman from time to time.

### NFA & APFC Aid

Following our first meeting in Chicago, the two national fertilizer associations, NFA and APFC, purchased blanket memberships in NSC for all their members. Dr. Russell Coleman and Ed Kapusta of NFA; Paul Truitt and Louis Wilson of APFC have given the safety movement in the fertilizer industry wonderful support and

*From an address entitled "Progress of Fertilizer Section, National Safety Council," presented at the Southern Safety Conference, Louisville, Ky. on March 8.*

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one of the 16 goals. We solicit your help—we need it.

First of all, we need all of the help we can get in increasing the membership. Next, I would like to implore each of you to contact all the fertilizer manufacturing plants in your state and sign them up in the NSC. You can do this much easier than can any of your national officers.

If your company has not already bought the copies of the Fertilizer section posters for each of your plants, please do this immediately. Order them from the NSC—they cost only two dollars for a set of 12.

You can all render material aid to help us achieve the objective of "Building a Bigger and Better Safety Contest."

You can contact all the fertilizer manufacturing plants in your state, and urge them to enter their plants in this year's Safety Contest. Certainly each of you will want to see to it that each of your company's plants is entered.

Send Tom Clarke news articles about yourself and reports of accidents which occurred in your plants—write articles on any phase of safety.

### Talk Safety

Talk up *safety* everywhere you go. Put lots of *enthusiasm* in your work. It has been said that "Faith can remove mountains" and let us remember that *enthusiasm* is "Faith in Action."

It is up to those of us who are charged with the responsibility of promoting *safety* in our industry to put everything we have into our work. If you put enough *enthusiasm* in your work you will be successful in selling *safety* to your management, your supervisory officials and to the employees in your plants. If you talk up *safety* strong enough and with enough *enthusiasm* in your contacts with representatives of other fertilizer manufacturing companies, you will be giving the officers of the Fertilizer section of the National Safety Council a wonderful boost.

If you talk up *safety* strongly enough it simply cannot be pushed aside or neglected. ♦

## Pest Reports

### Small Grain Pests

Surveys conducted during recent months by Federal and State entomologists in Texas, New Mexico, Oklahoma and Kansas indicate that no general widespread grain insect outbreak is in prospect for the four-state area.

Some locally heavy infestations of brown wheat mite may develop within the near future in the Texas Panhandle, western Oklahoma, Oklahoma Panhandle and southwestern Kansas. A few fields in all four states have been found that appear to have a threatening infestation of cutworms, but the infestation is not general. The most severe greenbug infestation appears to be localized in Payne county, Okla.

Several fields throughout Oklahoma have very heavy populations of the English grain aphid and the apple grain aphid, but these insects usually do not cause severe dam-

age. However, if the English grain aphid persists until April and May and infests the developing heads, additional damage may occur. A wheat curl mite has been found in a high percentage of wheat samples which were brought into the greenhouse from the northern half of Kansas during the fall of 1953.

By the middle of March greenbug populations as high as 200 per linear foot were found in south Payne and Logan counties, Okla., but by the latter part of the month the infestations were declining primarily due to parasites and predators. Earlier in the month some chemical control measures had been used. Light populations were reported from Ellis, Roger Mills, Dewey and Blaine counties, Okla. The first report of greenbugs in Kansas was received the last of March when a very light infestation was observed in barley in Anderson county. None were found in fields examined in Central Kansas counties. In Mississippi greenbug infestations on oats were observed or reported to be over the southern half of the State.

Armyworms, which in 1953 caused extremely heavy damage in some central states, are now active in the South. Heavy flights of moths have been noted at light traps in Tensas parish, La., lighter

flights in East Baton Rouge and Madison parishes. Earlier, a moderately heavy infestation of mostly mature larvae in wheat and oats had been reported from Arcadia parish. A medium infestation of armyworms on clover and alfalfa at Weimar, Colorado county, Tex., occurred early in March.

Alfalfa weevil adults by late March were showing activity in eastern Maryland. It will be recalled that these insects were first reported in the eastern states in 1952. Weevil activity was also becoming noticeable in several Utah counties.

### Fruit Insect Conditions

The peach tree borer infestation throughout the peach belt of Georgia is reported to be on the increase believed primarily due to ineffectiveness of sprays. A heavy local infestation of the borer was reported from near Lindale, Smith county, Tex.

In the Kearneysville, W. Va., area, the number of codling moth wintering larvae under tree bark is reported to be about normal but the survival percentage is relatively high. Also in that area the wintering females of the woolly apple aphid are numerous and widespread. Forbes scale is also widespread but the intensity is probably less than in 1953. Spider mites are probably less than normal with some hatching of *Bryobia* sp. having taken place about the middle of March.

Based on material received from Economic Insect Survey Station, Plant Pest Control Branch, Agricultural Research Service, USDA, supplemented with information received by FARM CHEMICALS from Federal and state agencies.

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Aphid infestation on Florida citrus was not expected to reach its peak before the middle of April. Hatching of purple scale in that state was slowly increasing with the peak expected in April. In Arizona spider mites were severe enough in some groves to warrant control.

In Louisiana there was a general infestation of Eastern tent caterpillar throughout the state on wild cherry, peach, plum and hawthorn.

### **Corn Borer Damage Figures for '53 Crop**

In a recent release compiled by R. L. Shotwell of the Section of Cereal and Forage Insect Investigations, the estimated loss caused by the European corn borer to the 1953 corn crop grown for grain was about 90,000,000 bushels which is equivalent to over three per cent of an estimated national crop of 2,869,636,000 bushels.

The estimated dollar loss is \$125,466,000 based on value received by the farmers as of Dec. 15, 1953. The estimates were made for 1,008 counties in 26 states and include 65 per cent of all the counties known to be infested in the United States. The 1952 loss was over 53,000,000 bushels valued at \$77,205,000.

### **Boll Weevil Survival Counts in Louisiana**

Trash examinations to determine the winter survival of boll weevils were completed in Madison parish, La., March 4, 1954. Mr. R. C. Gaines of the Section of Insects Affecting Cotton and Other Fiber Plants reported that the number of live weevils per acre, found per examination point, ranged from 0 to 6,050 with an average of 1,113. This average was about 1.4 times that found in Madison parish during the past 18 years. There were only five years (1945, 1949, 1950, 1951 and 1953) of the past 18 when the average per acre was higher. The number surviving this spring was 21 per cent of the number found in hibernation last fall. The survival this year was approximately one-half of the average survival during the past 17 years.

Fall hibernation counts for Florence county, S. C., have been received from R. L. Walker of the above-mentioned section. Dur-

ing the fall of 1953 surface trash from 10 farms in Florence county was examined and an average of 3,533 live weevils per acre was found. This compares with 6,259 per acre in the fall of 1952 and an over-all average for 11 years of 4,541. Only in 1943 and 1951 were fewer hibernating weevils found.

Previously reported fall hibernation counts in McNairy county, Tenn., showed a very heavy reduction in 1953 as compared to 1952. In Georgia the counts were slightly higher than the previous year.

### **Vegetable Insects**

According to a recent report by Dr. H. E. Dorst and Dr. G. F. Knowlton on beet leafhopper conditions in some of the western states, the beet leafhopper spring movement from the southern desert breeding areas to the cultivated areas of north and central Utah and western Colorado is expected to be light. The local movement in north and central Utah and in western Colorado is also expected to be light as is the movement to southern Utah, southern Nevada, southeastern California and central Arizona. The overwintering population in the southern breeding area is considered to be approximately one-sixth as large as that which occurred in 1953.

Spring host plant conditions are unfavorable for leafhopper breeding in most portions of the southern breeding grounds. The acreage of host plants is only about one-third that of 1953. In the local breeding areas of northern Utah, a light population of leafhoppers entered the winter under unfavorable conditions.

The condition and stand of spring host plants in the uncultivated areas in most cases is unfavorable. The movement of the leafhoppers into the cultivated districts of central Utah and western Colorado is expected to start by mid-April. Weather, of course, is a dominant factor. When an early spring follows a mild winter it usually advances the date of beet leafhopper movement from the uncultivated breeding areas to the cultivated districts. A late spring with excessive rainfall delays the date of the movement.

Various insects which were of concern to vegetable growers dur-

ing March were aphids on lettuce in Maricopa county, Arizona, on collards and winter kale in the Norfolk, Va., area and on cabbage and turnips in several Georgia counties; false chinch bug on vegetables in general in the Rio Grande valley of Texas, on turnips near Livingston, Tex., and in Kemper county, Miss., and spider mites which were damaging onions near Phoenix and watermelons in the Yuma, Ariz., area, heavy on strawberries in St. Tammany parish, La., and light on the same host in the Norfolk, Va., area. On strawberries in Dade co., Fla., area mites averaged 12 per leaf.

### **Matsucoccus Scale**

Matsucoccus scale has reached serious outbreak proportions on red pine in infested areas of Connecticut, New York, New Jersey and New Hampshire. It is becoming one of the most serious insect pests of red pine and, although the present infestation is restricted to definite localities, it constitutes a serious threat to thousands of acres of red pine in the Northeast.

A cooperative survey conducted by the above states and BEPQ during 1953 showed the infested area to include about 60 square miles in southwest Connecticut, 40 on Long Island and a few scattered spots in New York.

No evidence was found in natural red pine areas in northern New York, Massachusetts, Vermont, New Hampshire and Maine or in plantings in New Jersey and Massachusetts.

### **Gypsy Moth**

Neely Turner, chief entomologist, Connecticut Agricultural Experiment Station, reports that the worst gypsy moth outbreak on record is expected to strike Connecticut this year.

To date, more than 175,000 acres have been uncovered which are threatened with complete defoliation unless sprayed. The worst spots are said to be in Hartford and Litchfield counties.

### **Grasshoppers**

Very heavy egg deposition by grasshoppers during 1953 in Missouri has furnished the potential for a very severe, general infestation this year. ♦

## Bioquin 1 Tested for Fruit Disease Control

Copper 8-quinolinolate (Bioquin 1), was evaluated in tests by Dwight Powell, University of Illinois, as a fungicide for control of several pome fruit diseases. In comparison with a number of commercial fungicides in field tests on apple and pear it was excellent against bitter rot, fly speck and sooty blotch; good against apple scab, apple blotch and *Fabreaa* leaf-spot and fair in the control of cedar rust. It was not satisfactory in controlling fire-blight.

At concentrations suitable for control work, the material was not phytotoxic. The report states that, with or without sulfur, Bioquin 1 at  $\frac{1}{4}$  lb. to 100 gals. water, "is considered extremely safe to use on the most tender fruit foliage."

Although a  $\frac{1}{2}$  lb. to 100 gals. concentration was non-injurious in the tests, it was stated that slight fruit russett to Golden Delicious apple might be caused under some climatic conditions.

One pound to 100 gals. dosage will usually give a typical copper injury although in tests on pear, no injury was noted.

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*From "An Evaluation of Copper 8-Quinolinolate Fungicide Against Some Pome Fruit Diseases" by Dwight Powell, Plant Disease Reporter, Vol. 38, No. 2, Feb. 15, 1954, pages 76-79.*

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## Epps Gives Views on Determination Method

E. A. Epps, Jr., chief chemist, Division of Agricultural Chemistry, Louisiana Department of Agriculture and Immigration, writes to tell us that an error was made on page 47 of the February issue in the description of a phosphate determination method attributed to Drs. Gee and Deitz.

The information was received from the Bureau of Standards; however, Epps points out that the method was originally developed in 1908 by Mission. In 1948, he continues, Barton showed that the method was applicable to fertilizer analysis. Since that time others, including Epps, have made modifications of the method as applied to fertilizers.

"Gee and Deitz," Epps concludes, "have made a valuable contribution in improving the accuracy of the determination. However, it is erroneous to give them

credit for the development of the method."

The editors, and we hope the Bureau of Standards, stand corrected.

# Literature Reviews

**Bibliography on Materials Handling.** January 1954. Code No.: PB 111306. Available from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. 17 pages. Price: 50 cents.

This bibliography includes many suggestions for promoting efficiency and saving money, time and effort in handling materials. About 270 references have been collected in the publication.

**A Review of Phosphate Fertilizer Investigations in 15 Western States Through 1949.** Circular 927 of the USDA. Order from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 68

pages. Price: 25 cents.

For nearly a half century, agricultural scientists have studied many of the phosphate problems of the West. During this period a mass of data has accumulated; however, these data have never been reviewed and summarized. It is the purpose of this circular to review and inventory the information through 1949 and to summarize the findings.

**Soils and Soil Fertility** by Louis M. Thompson. Published by McGraw-Hill Book Co., Inc., 330 West 42nd St., New York City 36. 330 pages with 136 illustrations and diagrams and 132 tables. Price: \$5.00.

A manual on the soil—what it is, what makes it fertile, how man can help nature and correct his own mistakes. Its 17 chapters include information on the physical properties of soils, soil moisture, biological properties and chemical composition of soils, soil formation and classification, clay minerals, acidity, and alkalinity, principles and practice of liming, nitrogen, phosphorus, potassium, fertilizers, utilization of farm manure, sulfur and the minor elements, etc.

**Annual Publication of the Association of Economic Poisons Control Officials for 1954.** Order from Albert B. Heagy, secretary-treasurer, AEPCO, Box HH, University P. O., College Park, Md. Approx. 200 pages. Price: \$3.00.

Association business concerning uniform laws, regulatory principles, definitions of terms, convention papers, executive committee activities and a resume of state pesticide laws are given in the first section of the book.

Also included is a detailed review of sampling procedure, a complete list of officials and summarized data covering about 150 pesticide chemicals.

## CALENDAR

**April 5-7**—Nat. Farm Chemurgic Council conf., Memphis, Tenn.

**April 13-14**—Western Cotton Production conf., Phoenix, Ariz.

**April 27**—Assn. of Consulting Chemists & Chem. Engrs. symposium and banquet, New York City.

**April 29-30**—Second Annual Cal. Fert. conf., Visalia, Cal.

**May 17-20**—Basic Materials Exposition, Chicago.

**May 23-25**—CSMA mid-year meeting, Cincinnati, O.

**June 3-5**—Mfg. Chemists Assn. meeting and outing with SOCMA, White Sulphur Springs, W. Va.

**June 10-13**—APFC annual meeting, Hot Springs, Va.

**June 13**—Fert. sec., Nat. Safety Council, White Sulphur Springs, W. Va.

**June 14-16**—NFA meeting, White Sulphur Springs, W. Va.

**June 21-22**—Assn. of Southern Feed and Fert. Cont. Officials meeting, Oklahoma City, Okla.

**July 1-4**—Plant Food Producers of Canada, Murray Bay, Quebec.

**July 20-22**—Pacific N. W. Plant Food Assn. fert. conf., Klamath Falls, Ore.

**July 21-23**—Beltwide Cotton Mechanization Conf., Little Rock, Ark.

**Scientific, Medical and Technical Books Published in the United States, 1949-52** edited by R. R. Hawkins. Published by R. R. Bowker Co., 62 West 45th St., New York City 36. 580 pages. Price: \$10.

This is the second supplement in a series of three books covering scientific, medical and technical books published in the U. S. A. The base volume covers the period 1930-44 (\$20) and the first supplement, 1945-48 (\$10).

The second supplement contains 2,849 titles, each listed with author, number of pages, size, price, etc., and an approximate 200 word description. Also included is an author index, subject index and a directory of publishers.

**Successful Tung Farming** by Claude E. Beebe and Sam R. Greer. Published by Tung World Publishing Co., Tung World Building, Gulfport, Miss. Approx. 60 pages. Price: \$2.00.

Containing chapters on selecting, clearing and terracing the land, selecting and planting, pruning and training trees, cultivation, fertilization, harvesting, etc., this book has been described as a practical textbook on the culture of the tung tree.

## California Fertilizer Report

A report from the California Department of Agriculture shows that 162,856 tons of fertilizers were sold in that state during the quarter ended Dec. 31, 1953.

Ammonium sulfate heads the list with sales of 34,586 tons followed by dry mixed fertilizers at 32,518 tons. Other materials for which sales of over ten thousand tons were reported include ammonium nitrate, ammonium phosphate-sulfate, normal superphosphate, and ammonia solutions.

Of the dry mixed fertilizers, 10-10-5 is the top grade showing sales of 5,577 tons, followed by 8-8-4, 17-7-0, 8-10-12, 6-9-6 and 6-10-4. These grades account for 15,668 tons of the total.

The report also states that 160,393 tons of agricultural minerals were sold during the same period with gypsum and sewage sludge topping the list.

## Super Production Up

While December production of superphosphate was registering a gain of six per cent over the November figure, both shipments and stocks on hand also showed an increase.

Shipments were up four per cent over November with 95,932 tons reported, according to a Bureau of the Census report. Stocks on hand were six per cent greater, showing 278,454 tons.

A preliminary total for 1953 shows production and shipments of normal and enriched super down eight to seven per cent from 1952 while both production and shipment of concentrated material increased 19 and 16 per cent respectively. Production of wet-base goods declined 10 per cent but shipments increased six.

## 1952 Lime Use Gain

A major gain in lime for agricultural use was registered during 1952 according to the Bureau of Mines. A report from that office shows that tonnage for agriculture totaled 392,383 valued at \$3,816,603. Quicklime comprised 163,138 tons of the total and hydrated lime, 229,245. In 1951 the totals were 343,619, 118,673 and 224,946 respectively.

The district showing largest sales comprised Maryland, New Jersey, New York, Pennsylvania and West Virginia where 230,335 tons were accounted for. The report listed 160 active plants producing quick and hydrated lime.

# Production—December, 1953

*Compiled from government sources*

Chemical	Units	December		November
		1953	1952	1953
Ammonia, synth. anhydrous.....	s. tons	199,907	193,507	194,886
Ammonia liquor, coke oven (NH <sub>3</sub> content).....	pounds	4,207,798		4,222,103
Ammonium nitrate, fert. grade.....	s. tons	140,144	125,866	121,384
Ammonium sulfate				
synthetic (technical).....	s. tons	35,044	76,202	26,781
coke oven by-product.....	pounds	152,930,755		153,760,457
BHC (Hexachlorocyclohexane).....	pounds	3,588,150		2,791,821
Gamma content.....	pounds	479,033		460,522
Copper Sulfate (Gross).....	s. tons	5,904		5,212
DDT.....	pounds	7,056,304		6,056,608
2,4-D Acid.....	pounds			1,652,273
esters & salts.....	pounds	1,211,331		1,310,894
Lead Arsenate (acid & basic).....	s. tons	278		
Phosphoric Acid (50% H <sub>3</sub> PO <sub>4</sub> ).....	s. tons	196,595	177,178	204,575
Sulfuric Acid, gross.....	s. tons	1,166,896	1,192,921	1,207,586
Chamber process.....	s. tons	243,344	248,164	242,302
Contact process.....	s. tons	923,552	944,757	965,284
Superphosphate, total (100% APA).....	s. tons	168,061	169,459	157,845
Normal & Enriched (100% APA).....	s. tons	132,668	134,695	121,083
Concentrated (100% APA).....	s. tons	34,549	33,846	35,713
Wet Base (100% APA).....	s. tons	844	918	1,049
2,4,5-T Acid.....	pounds	...	...	...

# FERTILIZER MATERIALS MARKET

## New York

March 31, 1954

**Organics.** Organic fertilizer materials improved in price. Demand increased both from feed and fertilizer buyers and offerings were limited in many materials. Soybean meal moved up to \$86 per ton in bulk, f.o.b., Decatur, because some producing mills are shutting down. Cottonseed meal enjoyed a good market with prices quoted at \$75 per ton, f.o.b. Southeastern production points. Linseed meal was firm with offerings for nearby shipment difficult to locate. Blood sold at \$8.25 per unit of ammonia (\$10.00 per unit N) f.o.b. New York, and tankage sold at \$7.50 (\$9.12 per unit N), f.o.b. New York.

**Fish Meal.** With most of the old menhaden fishmeal crop disposed of, buyers were looking more to imported fish meal as a source of their requirements. Last sales of 60 per cent imported fish meal were made at \$140 per ton, f.o.b. ports. Menhaden fishing is not expected to start for some time.

**Sulfate of Ammonia.** This material has moved out quite rapidly in the last few weeks, particularly in the Midwest, and some of the surplus stocks have been disposed of. With a lower rate of steel production, the supply will now be more in line with the demand and very little imports are noted.

**Potash.** Shipments are moving against contracts although most domestic producers report shipments behind last year but up to date. Little imported material is reported moving with no price changes noted.

**Superphosphate.** A tight situation is reported in shipments of triple superphosphate because some of the new plants, expected to get into operation during the past month, have been unable to get any great amount of production due to mechanical difficulties. Regular superphosphate was moving

better in most sections but some export demand was noted.

**Bone Meal.** This material was difficult to obtain for immediate shipment as some producing plants have shut down. Last sales were made on basis of \$60 per ton, f.o.b. ports. A tight situation is looked for during the next 60 days as feed buyers have been very active in the market.

**Nitrogenous Tankage.** With some producers sold out for nearby delivery, this material is in a stronger position. Present price ranges from \$3.65 to \$4.40 per unit of ammonia (\$4.43 to \$5.35 per unit N), according to shipping point.

**Castor Pomace.** No material was being offered for prompt shipment because the port strike at New York has stopped the entry of castor beans into the country. Last sales were made on basis of \$25 per ton, f.o.b. production points.

**Urea.** Demand improved slightly for imported material with last sales at \$120 per ton, f.o.b. port of entry. Stocks were adequate to take care of expected demand.

**Hoof Meal.** Little change was noted in this material with sales reported at \$6.75 per unit of ammonia (\$8.20 per unit N), Chicago.

**Ammonium Nitrate.** Demand has increased, particularly in the Midwest for prompt shipment and producers are shipping against current orders.

**Nitrate of Soda.** No price changes were reported and a fair demand was reported from Southern ports with stocks adequate to take care of expected demand.

## Philadelphia

March 10, 1954

Shipments of raw fertilizer materials are moving quite a little better, but new business is still

slow and spotty. Farmers are now doing a better job at taking delivery of their mixed goods.

**Ammonia Nitrate.** Production is sold well ahead and deliveries are now seasonally well under way.

**Sulfate of Ammonia.** Shipments have increased to the point where stocks are being gradually reduced and it is suggested that in another month the surplus will not be of any too great consequence.

**Nitrate of Soda.** Normal spring movement is now on and supplies are keeping up with the demand. No price changes are noted.

**Blood-Tankage-Bone.** Blood and tankage are again in strong position with supplies not too plentiful. Blood is quoted at \$8 (\$9.72 per unit N) in the East and \$8.25 (\$10.02 per unit N) Chicago area. Tankage is \$7 (\$8.51 per unit N) New York basis and \$7.75 (\$9.42 per unit N) at Chicago. Steamed bone is still quoted at \$55 per ton with good demand, while hoof meal is in fair demand at \$6.75 per unit ammonia (\$8.20 per unit N) Chicago basis.

**Castor Pomace.** Present movement is rather sporadic with price still at \$25 per ton.

**Fish Scrap.** Menhaden meal is in very tight supply with market more or less nominal at \$137.50 to \$140 per ton.

**Phosphate Rock.** Supply is reported to be comfortable, with demand fair, and there is slightly increased call for deliveries against contracts.

**Superphosphate.** Demand shows considerable improvement and stocks are quite ample.

**Potash.** Movement against contracts is actively under way, and in some instances delivery demands are taxing the capacity of loading facilities.



**TOP:** General view of MCC's plant, office and facilities.

**BOTTOM:** New gas reforming facilities at right, nitric acid units in center back, old gas reforming section at left and the compressor building at extreme left.



## Mississippi Chemical Adds Ammonia Unit

Mississippi Chemical Corp. completed one phase of its expansion program during the week of Feb. 15 when it put into operation capacity for daily production of 60 additional tons of ammonia. The unit has already topped its rated capacity, which brings MCC's ammonia production facilities up to more than 180 tons per day.

The corporation's process for gas reforming consists of a single stage reformer operating at 15 pounds outlet pressure followed by CO conversion and MEA scrubbing for CO<sub>2</sub> removal. Gas then is compressed to 1,000 atmospheres prior to high pressure methanation and ammonia synthesis using the Claude ammonia synthesis process.

A continuation of MCC's ammonia expansion program for this year consists of constructing a low pressure methanation unit which will remove all the carbon monoxide prior to compression. This will provide additional compressor capacity and free the present high pressure methanator for use as an ammonia converter. This step will be followed by additional reforming capacity and compression which will ultimately bring total capacity to approximately 290 tons a day.

Mississippi Chemical also started construction of a 120-ton addition to the nitric acid facilities on Feb. 1. Almost all the processing equipment required for this unit has been purchased from Europe.

Construction commenced in January on a new ammonium nitrate prilling unit which will bring its total daily prilling capacity to about 500 tons of ammonium nitrate. ♦

APRIL, 1954

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# Fieldmen & Profits

**I**N ANY highly competitive field, the attitude of fieldmen or sales personnel and the personnel policies of their companies often make the difference between a successful or a profitless year.

During the past month a letter which we received from the head of a highly respected farm chemicals company and the remarks of a top-flight Virginia-Carolina fertilizer salesman reflected many of the necessary elements of a successful management-sales force relationship.

The letter summed up some of the ways in which the company strives to maintain what the official termed an "esprit de corps" among its fieldmen—a feeling which is considered of paramount importance to his organization.

He relates that an undeviating price policy is used—a set price for carloads and LCL. Fieldmen are told the costs of basic materials, the markup, costs of overhead and other factors involved in pricing the company's products. The sales force knows that to sell at a price below the percentage, overhead cost of doing business is actually a loss and so, when an order is lost, the men don't complain. As the writer states, "they (the salesmen) say, 'Well, let such-and-such a company lose money; it's all right with me'."

A standard compensation setup is maintained by this organization for all fieldmen. Their potential is unlimited, dependent only on the efforts they put forth.

**T**HIS company uses only fieldmen with a degree from an "accredited college of agriculture" which indicates that the semi-monthly staff meetings are definitely educational and, therefore, practical. Because of their background, the salesmen can understand why a particular fertilizer material is used in the products they sell and can realize that only top quality materials are included.

Another point brought out is that salesmen act as collectors. The company feels that because fieldmen are so close to the customer, they can "ask and insist upon payment of an account and create less animosity than would an office man or a professional collector."

Fieldmen insist that they be consulted when any communication is sent to a delinquent account. Although this takes time, the fieldman has been shown that it is better to take the necessary time to retain an old and good customer than it is for him to take the same or an even greater period of time to replace a lost one.

The regular staff meetings help to keep everyone up-to-date on new developments and keep the sales force "on their toes." The majority of sessions are termed factual and filled with discussion.

These brief notes on the operation of this particular company help to explain its success in the production and marketing of farm chemicals.

**W**HEN the January issue of *V-C News* came across the desk we were immediately attracted by the comments of Bill Spivey, a Virginia-Carolina fertilizer salesman working out of the Norfolk, Va. office.

His comments on loyalty seem to reflect the attitude and beliefs of a person who possesses the spirit considered so essential by our correspondent.

"May I suggest a thought that has," Spivey says, "impressed me over the years and a practice that will prove profitable in many ways? It is the lesson of loyalty."

"We should be loyal to our employers. 'Business before pleasure' has always been a good slogan. During certain seasons of the year our work is hard and the hours are long. At times we must forego some pleasures in order that our duties have our undivided attention. Sooner or later we find time for our personal affairs and our average in this respect is in line with that of other industries. . . ."

"We should be loyal to our fellow man. This group includes our loved ones, customers, friends and associates and, yes, our competitors, too. We must deal fairly with people at all times. In every transaction we must see that every person involved receives that to which he is justly entitled. Then, if you wish to do business in which there is no loss, but profit to all parties concerned, deal in life's extras, such as the gentle handclasp, the friendly smile, the kind word of encouragement or, in the words of theologian, 'go the second mile'."

"We should be loyal to ourselves. We may take a vacation from our work; we may go into seclusion from our fellow man; but as long as we are alive, we must live with ourselves. . . ."

We feel that these remarks demonstrate some of the essentials of top flight organizations. Although our industry must contend with the vagaries of nature, farm profits and a host of other influences, it would seem that a similar attitude in other companies could prove only beneficial, leading not only to better employer-employee-customer relationships, but to a sounder and more profitable business as well.

As Bill Spivey says, "While our methods may vary from time to time, some phases of our business will always basically remain the same. There can never be substitutes for such practices as intelligent planning, honest and persistent efforts and sound credits."

—GEO. P. TEEL, JR.  
Managing Editor

FARM CHEMICALS

## 101—Wear Resistant Chains

Rex Z-metal chains from Chain Belt Co. are constructed of a special heat treated alloyed ferrous metal which resists corrosion and abrasion. The metal is considerably harder than malleable iron and provides longer chain life. A bulletin is available describing the results of laboratory tests and field applications, including use in hot den of a super plant. For a copy

CIRCLE 101 ON SERVICE CARD

## 102—Simplifying Formulation

Nopco Chemical Co. states that 90 per cent of pesticide formulations can be produced with their three Agrimul emulsifiers. The products give excellent flash dispersion, spray stability, storage stability and uniformity. A new booklet, "New Departure in Pesticide Emulsifiers," containing formulas for all purposes is available.

CIRCLE 102 ON SERVICE CARD

## 103—All-Purpose Respirator

A single respirator introduced by Mine Safety Appliance protects the wearer against both toxic dusts and organic vapors. Static-web dust filters are used, clamping on the twin chemical cartridge respirators. The cartridge and filters are independently replaceable for greatest use economy. For more information

CIRCLE 103 ON SERVICE CARD

## 104—Chamber Sprays

Stoneware chamber spray nozzles from Monarch Manufacturing Works are easy cleaning, non-corrosive and non-erosive. A catalog describes styles and capacities of stoneware chamber sprays, strainers, hard rubber spray nozzles, non-clog nozzles and solid spray nozzles. The company points out that increased capacity of acid plants will result when using water sprays instead of steam especially in hot weather. For a copy of the catalog

CIRCLE 104 ON SERVICE CARD

## 105—The Art of Spreading

A free booklet on "The Art of Spreading" has been released by Baughman Manufacturing Co. Fertilizer spreaders produced by Baughman have a long list of firsts including the first direct simple motor drive and the first new direct ground speed drive. To obtain a copy

CIRCLE 105 ON SERVICE CARD

## 106—CalSpray Lindane

Ortho Lindane produced by California Spray-Chemical Corp. is 100 per cent pure gamma—quality that tops minimum government requirements for pure lindane. The dry, free-flowing crystalline particles can be formulated for sprays or dusts and are easily ground to micro-size. Complete information is contained in the "Story of Lindane."

CIRCLE 106 ON SERVICE CARD

FREE INFORMATION to help you  
solve fertilizer, pesticide problems

# Reader Service

## 107—Non-Slip Ink

Hudson Pulp & Paper's new Non-Slip Ink takes the skid out of your bags. The company claims bags printed with the ink are better protected against rough handling, require less re-handling due to slippage, are free moving on chutes or conveyors and are easier and faster to handle. For the complete story

CIRCLE 107 ON SERVICE CARD

## 108—Etho-Chemicals

A new Armour Chemical division catalog on Etho-Chemicals includes a discussion of types of surfactants, chemical properties of etho-chemicals, solubility data, information on selection of an emulsifier and emulsification tables. A section on industrial application describes typical insecticide and herbicide emulsion formulations. To obtain the catalog

CIRCLE 108 ON SERVICE CARD

### How to use the READER SERVICE CARD

- Circle number of literature you want.
- Print your name, position, company and address.
- Clip and mail the Service Card.

## 109—Screens Up Fert. Production

Two gyrating screens by Simplicity Engineering Co. are used by one large fertilizer plant to speed up operation and increase production. A 3 foot x 8 foot model LS single deck unit handles up to 50 tons of super per hour and a 3 foot x 6 foot model G single deck handles all other ingredients at about the same rate. Both are set at 20 degrees and rotate with the flow of ingredients. For complete information

CIRCLE 109 ON SERVICE CARD

## 110—Bromofume

A new soil fumigant, Bromofume, from Eston Chemicals division, has proved particularly valuable on various truck crops, sugar beets and cotton. Application of the material releases toxic vapors which are diffused to a depth of from 12 to 18 inches. A leaflet is available.

CIRCLE 110 ON SERVICE CARD

## 111—Lab Services

Wisconsin Alumni Research Foundation has published a price schedule of its laboratory services which includes biological insecticide testing, insecticide analysis, fungicide and bactericide screening in addition to other assays and tests on agricultural and chemical products. For a copy

CIRCLE 111 ON SERVICE CARD

## 112—Diamond Herbicides

Diamond Alkali claims to be a formulator's best friend when it comes to 2,4-D and 2, 4, 5-T brush and weed killers. Technical esters available include butyl, isopropyl and butoxy ethoxy propanol (low-vol). For information on costs, technical service and other details

CIRCLE 112 ON SERVICE CARD

## 113—Wanted: NH<sub>3</sub> Applicator Dealers

The KBH Corp. suggests that you get a full share of the agricultural ammonia business by offering customers the KBH line of field applicators. Included are front or rear mounted applicators in addition to pull type. All can be used for pre-planting, side-dressing or broadcast application. For dealership details

CIRCLE 113 ON SERVICE CARD

## 114—Nevsolv Solvents

Neville Chemical Co. offers active solvents for DDT, BHC, 2, 4-D, etc., which are described as especially clean, with good odor characteristics. The Nevsolv are moderately priced and prompt shipments can be made in drum or tank car lots. For data sheets

CIRCLE 114 ON SERVICE CARD

## 115—Auger-Matic Bagger

Any free flowing substance can be placed in 25-100 pound valve sacks with E. D. Coddington Mfg.'s Auger-Matic bagger. The unit has push button controls and is fully automatic. With an adapter, the bagger can be used for filling barrels and open mouth bags. The company states that 100-pound bags can be packed in six to 10 seconds. For more information

CIRCLE 115 ON SERVICE CARD

## 116—Basic Planning

A booklet from Walter Kidde Constructors provides an outline of a program which has been successfully applied to a variety of industries. "Basic Planning—Plant Modernization and Expansion" constitutes a thorough guide to extracting maximum production efficiency from a modernization or expansion program. To obtain a copy

CIRCLE 116 ON SERVICE CARD

## 117—Telvar Weed Killer

A full color brochure shows the results of DuPont's Telvar W weed killer application to various industrial sites. Telvar W is the company's new name for CMU herbicide. Pictures show the excellent job that is possible around plants, railroad facilities, storage areas, guard rails, etc.

CIRCLE 117 ON SERVICE CARD

## 118—Auto Filling Scales

A catalog sheet from Thayer Scale & Eng. Corp. illustrates two automatic filling scales. The first is a gross weigher which automatically holds, fills, check weighs and releases bags weighing from 25 to 100 pounds. The other is a net weight filling scale which automatically preweighs, check-weighs and discharges loads in the same weight range. Both are designed for operation with granular, flake, pellet or fibrous materials. For a copy of the sheet

CIRCLE 118 ON SERVICE CARD

## 119—Toximul 150

For better formulations, Ninol Laboratory suggests that you use Toximul, anionic-nonionic blends which provide good flash dispersibility and emulsion stability. Toximul 150 is designed for use with toxaphene, four pound chlordane and heptachlor. For a technical bulletin and sample of this emulsifier

CIRCLE 119 ON SERVICE CARD

## 120—Nitrogen Solution Systems

J. M. Tull Metal & Supply Co. can furnish a simplified package of certified nitrogen solution system parts for immediate shipment. Each part is guaranteed to provide perfect service. For a copy of Tull's booklet on the installation and operation of a nitrogen solution system

CIRCLE 120 ON SERVICE CARD

## 121—"New Leader" Spreaders

The New Leader line of fertilizer spreaders produced by Highway Equipment Co. are built to solve modern spreading problems. According to the company there are no chains or sprockets, no friction clutches and no series of counter-shafts. These motor driven spreaders are guaranteed to be the most accurate truck-mounted spreaders available. For more information on the 1954 line

CIRCLE 121 ON SERVICE CARD

## 122—Canister Masks

A new bulletin has been issued by Acme Protection Equip. Co. describing its canister-type gas masks with emphasis on clarification of proper application. Information includes canister construction, canister life, methods of determining gas concentrations, heating and humidity, oxygen deficiency and data on recommended equipment for specific hazards including those in agricultural and chemical fields.

CIRCLE 122 ON SERVICE CARD

### How to use the READER SERVICE CARD

- Circle number of literature you want.
- Print your name, position, company and address.
- Clip and mail the Service Card.

## 123—Granular Attapulgus

Granular grades of attapulgus have been developed by Attapulgus Mineral & Chem. which have formulating and application characteristics of special value in soil insect control. They have a great sorptive capacity and provide excellent coverage with ground or air application. Particle size ranges are available to suit all applications. For a data sheet

CIRCLE 123 ON SERVICE CARD

## 124—New Fischbein Closer

The Dave Fischbein Co. has introduced a new portable bag closer, the Model C. This unit is adaptable to a wider range of bags than previous models and can handle all types of paper bags including five and six ply multi-wall gusseted types, in addition to all textile bags with or without asphalt lamination. Features include an easy operating trigger-style switch. For more details

CIRCLE 124 ON SERVICE CARD

## 125—Portable Sewing Unit

The portable J-175 bag closing sewing machine from Minneapolis Sewing Machine Co. can be used for paper, cotton or burlap sacks. It uses the standard two thread chain stitch and sews over bag gathers without stops. The unit hangs from the ceiling and is fully adjustable by a counter balance. Stationary model has larger capacity thread holders and is permanently suspended with two pulleys and cable. For more information

CIRCLE 125 ON SERVICE CARD

## 126—Seed Treatments

A bulletin released by Buffalo Electro-Chemical provides an outline of the potentialities of peroxygen chemicals as seed treatments. Data includes consideration of their application in the removal of seed coats, disinfection of the coat, improvement of seed germination and improvement of gluten quality in wheat grain. To obtain a copy

CIRCLE 126 ON SERVICE CARD

## 127—Ammonia Plant Costs

A booklet is available describing the economics of the M. W. Kellogg ammonia process on various feeds and capacity. The process features high yields and low operating costs, special reactor design and high pressure reforming. A flow sheet is included in the publication.

CIRCLE 127 ON SERVICE CARD

## 128—Diluent Clays

Barney Clay and Perry Clay are available from the United Clay Mines. The first is a non-abrasive type mined in South Carolina. Perry Clay is a free flowing, air-floated type which has been used extensively for dusting during the past 10 years. Both are available in car or truck loads in 50 pound de-aired bags. For technical data and samples

CIRCLE 128 ON SERVICE CARD

## 129—Penick Malathion

All purpose malathion formulations are available from S. B. Penick & Co. This popular insecticide has a low mammalian toxicity, high insect toxicity, fast disappearing residues, excellent compatibility and is one of the safer insecticides to handle. For samples and literature

CIRCLE 129 ON SERVICE CARD

## 130—Electronic Metal Detector

A new electronic metal detector from Dings Magnetic Separator Co. is sensitive to all metals, ferrous or non-ferrous, and will detect even minute metallic particles. A wide range of signal and reject system arrangements is available to provide automatic detection with manual, semi-automatic or fully automatic rejection of tramp metal. Bulk or packaged materials can be handled. For a bulletin describing the detector in detail

CIRCLE 130 ON SERVICE CARD

# Buyers' Guide

## Classified Index to Advertisers in 'Farm Chemicals'

### ALDRIN

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Pittsburgh Coke & Chem. Co., Agr. Chem. Div.,  
Pittsburgh, Pa.  
Shell Chemical Co., Agr. Chem. Div., Denver, Colo.

### AMMONIA—Anhydrous and Liquor

Commercial Solvents Corporation, New York City  
Lion Oil Co., El Dorado, Ark.  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.  
Phillips Chemical Co., Bartlesville, Okla.  
Spencer Chemical Co., Kansas City, Mo.

### AMMONIUM NITRATE

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Commercial Solvents Corporation, New York City  
Lion Oil Co., El Dorado, Ark.  
Phillips Chemical Co., Bartlesville, Okla.  
Spencer Chemical Co., Kansas City, Mo.

### AMMONIUM PHOSPHATE

Monsanto Chem. Co., St. Louis, Mo.

### AMMONIUM SULFATE

See Sulfate of Ammonia

### AMMONIUM SULFATE NITRATE

Baker & Bro., H. J., New York City

### BAGS—Multiwall-Paper

International Paper Co., Bagpak Div., N. Y. C.  
Hammond Bag & Paper Co., Wellsburg, W. Va.  
Hudson Pulp & Paper Corp., N. Y. C.  
Kraft Bag Corporation, New York City  
Union Bag & Paper Corp., New York City

### BAGS—Dealers and Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.

### BAG CLOSING MACHINES

Fischbein Co., Dave, Minneapolis, Minn.  
International Paper Co., Bagpak Div., N. Y. C.

### BAG PRINTING MACHINES

Schmutz Mfg., Louisville, Ky.

### BAG FILLING MACHINES

Atlanta Utility Works, The, East Point, Ga.  
Stedman Foundry and Machine Co., Aurora, Ind.

### BHC AND LINDANE

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Diamond Alkali Co., Newark, N. J.  
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.  
Pittsburgh Coke & Chem. Co., Agr. Chem. Div.,  
Pittsburgh, Pa.

### BONE PRODUCTS

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Baker & Bro., H. J., New York City  
Bradley & Baker, N. Y. C.  
Jackle, Frank R., New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

### BORAX AND BORIC ACID

Woodward & Dickerson, Inc., Philadelphia, Pa.

### BROKERS

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Baker & Bro., H. J., New York City  
Bradley & Baker, N. Y. C.  
Jackle, Frank R., New York City  
Keim, Samuel D., Philadelphia, Pa.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

APRIL, 1954

### BUCKETS—Hoist, Crane, etc.

Hayward Company, The, New York City

### CALCIUM ARSENATE

American Agricultural Chemical Co., N. Y. C.

### CARS AND CART

Atlanta Utility Works, The, East Point, Ga.  
Stedman Foundry and Machine Co., Aurora, Ind.

### CASTOR POMACE

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Baker & Bro., H. J., New York City

### CHEMISTS AND ASSAYERS

Shuey & Co., Inc., Savannah, Ga.  
Wiley & Company, Baltimore, Md.

### CHLORDANE

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Pittsburgh Coke & Chem. Co., Agr. Chem. Div.,  
Pittsburgh, Pa.

### CLAY

Ashcraft-Wilkinson Co., Atlanta, Ga.

### CONDITIONERS

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Baker & Bro., H. J., New York City  
Jackle, Frank R., New York City  
Keim, Samuel D., Philadelphia, Pa.  
National Lime & Stone Co., Findlay, Ohio

### CONVEYORS—Belt

Link-Belt Co., Chicago, Ill.

### COPPER SULFATE

Tennessee Corp., Atlanta, Ga.

### COTTONSEED PRODUCTS

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
Jackle, Frank R., New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

### DDT

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Diamond Alkali Co., Newark, N. J.  
Monsanto Chemical Co., St. Louis, Mo.  
Pittsburgh Coke & Chem. Co., Agr. Chem. Div.,  
Pittsburgh, Pa.

### DIELDRIN

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Pittsburgh Coke & Chem. Co., Agr. Chem. Div.,  
Pittsburgh, Pa.  
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.

### DILUENTS

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Pioneer Pyrophyllite Producers, Beverly Hills,  
Calif.  
Pittsburgh Coke & Chem. Co., Agr. Chem. Div.,  
Pittsburgh, Pa.  
Summit Mining Corporation, Carlisle, Pa.  
Thomas Alabama Kaolin Co., Baltimore, Md.

### DITHIOCARBAMATES

Berkshire Chemicals, New York City

### ELEVATORS—Bucket

Link-Belt Co., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.

### ENGINEERS—Chemical and Industrial

Chemical Construction Corp., New York City  
Fairlie, Inc., Andrew M., New York City  
General Industrial Development Corp., N. Y. C.  
Marietta Concrete Corporation, Marietta, Ohio  
Stedman Foundry and Machine Co., Aurora, Ind.  
Titelstad Corporation, Nicolay, New York City

### FERTILIZER—Mixed

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Davison Chemical Corporation, Baltimore, Md.  
International Min. & Chem. Corp., Chicago, Ill.

### FILLERS

Bradley & Baker, N. Y. C.

### FISH SCRAP AND OIL

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Baker & Bro., H. J., New York City  
Bradley & Baker, N. Y. C.  
Jackle, Frank R., New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

### FULLER'S EARTH

Ashcraft-Wilkinson Co., Atlanta, Ga.

### FUNGICIDES

American Agricultural Chemical Co., N. Y. C.  
Berkshire Chemicals, New York City  
Pittsburgh Coke & Chemical Co., Agr. Chem. Div.,  
Pittsburgh, Pa.  
Tennessee Corp., Atlanta, Ga.

### HERBICIDES

Diamond Alkali Co., Newark, N. J.  
Lion Oil Company, El Dorado, Ark.  
Monsanto Chemical Co., St. Louis, Mo.  
Pittsburgh Coke & Chem. Co., Agr. Chem. Div.,  
Pittsburgh, Pa.

### HERBICIDES—Oils

Lion Oil Company, El Dorado, Ark.

### HOPPERS & SPOUTS

Atlanta Utility Works, The, East Point, Ga.  
Stedman Foundry and Machine Co., Aurora, Ind.

### IMPORTERS, EXPORTERS

Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Baker & Bro., H. J., New York City  
Berkshire Chemicals, New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

### INSECTICIDES

American Agricultural Chemical Co., N. Y. C.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Berkshire Chemicals, New York City  
Diamond Alkali Co., Newark, N. J.  
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.  
Pittsburgh Coke & Chem. Co., Agr. Chem. Div.,  
Pittsburgh, Pa.  
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.  
U. S. Industrial Chemicals Co., New York City

### IRON SULFATE

Tennessee Corp., Atlanta, Ga.

### LEAD ARSENATE

American Agricultural Chemical Co., N. Y. C.

### LIMESTONE

American Agricultural Chemical Co., N. Y. C.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
National Lime & Stone Co., Findlay, Ohio

# Buyers' Guide

## MACHINERY—Acid Making and Handling

Atlanta Utility Works, The, East Point, Ga.  
Chemical Construction Corp., New York City  
Monarch Mfg. Works, Inc., Philadelphia, Pa.  
Stedman Foundry and Machine Co., Aurora, Ind.

## MACHINERY—Acidulating

Chemical Construction Corp., New York City

## MACHINERY—Grinding and Pulverizing

Atlanta Utility Works, The, East Point, Ga.  
Bradley Pulverizer Co., Allentown, Pa.  
Stedman Foundry and Machine Co., Aurora, Ind.

## MACHINERY—Material Handling

Atlanta Utility Works, The, East Point, Ga.  
Clark Equip. Co., Construction Mach. Div., Benton Harbor, Mich.  
Hayward Company, The, New York City  
Hough, The Frank G. Co., Libertyville, Ill.  
Lewman Mfg. Co., Des Moines, Ia.  
Link-Belt Co., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.

## MACHINERY—Mixing, Screening and Bagging

Atlanta Utility Works, The, East Point, Ga.  
Stedman Foundry and Machine Co., Aurora, Ind.

## MACHINERY—Power Transmission

Link-Belt Co., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.

## MACHINERY

### Superphosphate Manufacturing

Atlanta Utility Works, The, East Point, Ga.  
Link-Belt Co., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.

## MAGNESIUM SULFATE

Berkshire Chemicals, New York City

## MANGANESE SULFATE

Tennessee Corp., Atlanta, Ga.

## MANURE SALTS

Potash Co. of America, Washington, D. C.

## MINOR ELEMENTS

Tennessee Corporation, Atlanta, Ga.

## MIXERS

Atlanta Utility Works, The, East Point, Ga.  
Stedman Foundry and Machine Co., Aurora, Ind.

## NITRATE OF POTASH

Berkshire Chemicals, New York City

## NITRATE OF SODA

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.  
International Min. & Chem. Corp., Chicago, Ill.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## NITROGEN SOLUTIONS

Commercial Solvents Corporation, New York City  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.  
Lion Oil Company, El Dorado, Ark.  
Phillips Chemical Co., Bartlesville, Okla.  
Spencer Chemical Co., Kansas City, Mo.

## NITROGEN MATERIALS—Organic

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Baker & Bro., H. J., New York City  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
Jackie, Frank R., New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## NOZZLES—Spray

Monarch Mfg. Works, Philadelphia, Pa.  
Spraying Systems Co., Bellwood, Ill.

## PARATHION

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Monsanto Chemical Co., St. Louis, Mo.  
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

## PENTACHLOROPHENOL

Monsanto Chemical Co., St. Louis, Mo.

## PHOSPHATE ROCK

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Baker & Bro., H. J., New York City  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## PHOSPHORIC ACID

American Agricultural Chemical Co., N. Y. C.  
Monsanto Chemical Co., St. Louis, Mo.

## PLANT CONSTRUCTION—Fertilizer and Acid

Atlanta Utility Works, The, East Point, Ga.  
Chemical Construction Corp., New York City  
General Industrial Development Corp., N. Y. C.  
Link-Belt Co., Chicago, Ill.  
Monsanto Chemical Co., St. Louis, Mo.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Titelstad Corporation Nicolay, New York City

## POTASH—Muriate

American Potash & Chemical Corp., N. Y. C.  
Ashcraft-Wilkinson Co., (Duval Potash) Atlanta, Ga.  
Baker & Bro., H. J., New York City  
Bradley & Baker, N. Y. C.  
Duval Sulphur & Potash Co., Houston, Tex.  
International Min. & Chem. Corp., Chicago, Ill.  
Potash Co. of America, Washington, D. C.  
Southwest Potash Corporation, New York City  
United States Potash Co., N. Y. C.

## POTASH—Sulfate

American Potash & Chemical Corp., N. Y. C.  
Baker & Bro., H. J., New York City  
International Min. & Chem. Corp., Chicago, Ill.  
Potash Co. of America, Washington, D. C.

## POTASSIUM PHOSPHATE

Monsanto Chemical Co., St. Louis, Mo.

## PRINTING PRESSES—Bag

Schmutz Mfg. Co., Louisville, Ky.

## PYROPHYLLITE

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.

## REPAIR PARTS AND CASTINGS

Atlanta Utility Works, The, East Point, Ga.  
Stedman Foundry and Machine Co., Aurora, Ind.

## SCALES—Including Automatic Baggers

Atlanta Utility Works, The, East Point, Ga.  
Stedman Foundry and Machine Co., Aurora, Ind.

## SCREENS

Atlanta Utility Works, The, East Point, Ga.  
Stedman Foundry and Machine Co., Aurora, Ind.

## SPRAYS

Monarch Mfg. Works, Inc., Philadelphia, Pa.  
Spraying Systems Co., Bellwood, Ill.

## STORAGE BUILDINGS

Butler Manufacturing Co., Kansas City, Mo.  
Marietta Concrete Corporation, Marietta, Ohio

## SULFATE OF AMMONIA

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Baker & Bro., H. J., New York City  
Bradley & Baker, N. Y. C.

Jackie, Frank R., New York City  
Lion Oil Co., El Dorado, Ark.  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.  
Phillips Chemical Co., Bartlesville, Okla.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## SULFATE OF POTASH—MAGNESIA

International Min. & Chem. Corp., Chicago, Ill.

## SULFUR

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Texas Gulf Sulphur Co., New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## SULFUR—Dusting & Spraying

Ashcraft-Wilkinson Co., Atlanta, Ga.  
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

## SULFURIC ACID

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
Lion Oil Company, El Dorado, Ark.  
Monsanto Chemical Co., St. Louis, Mo.  
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

## SUPERPHOSPHATE

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Baker & Bro., H. J., New York City  
Bradley & Baker, N. Y. C.  
Davison Chemical Corporation, Baltimore, Md.  
International Min. & Chem. Corp., Chicago, Ill.  
Jackie, Frank R., New York City  
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## SUPERPHOSPHATE—Concentrated

Armour Fertilizer Works, Atlanta, Ga.  
Baker & Bro., H. J., New York City  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## TALC

Ashcraft-Wilkinson Co., Atlanta, Ga.

## TANKAGE

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
Jackie, Frank R., New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## TEPP

Monsanto Chemical Co., St. Louis, Mo.

## TOXAPHENE

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Pittsburgh Coke & Chem. Co., Agr., Chem. Div., Pittsburgh, Pa.

## 2, 4-D

Diamond Alkali Co., Newark, N. J.  
Monsanto Chemical Co., St. Louis, Mo.  
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

## 2, 4, 5-T

Diamond Alkali Co., Newark, N. J.  
Monsanto Chemical Co., St. Louis, Mo.  
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

## UREA & UREA PRODUCTS

Baker & Bro., H. J., New York City  
Bradley & Baker, N. Y. C.  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.

## VALVES

Atlanta Utility Works, The, East Point, Ga.  
Monarch Mfg. Works, Inc., Philadelphia, Pa.

## ZINC SULFATE

Tennessee Corp., Atlanta, Ga.

## FARM CHEMICALS



# Announcing

## Pennsalt's NEW BHC PLANT

**Now in Full Commercial Production of Both High Gamma 46% Technical and Standard 14% Technical**

You can now look to Pennsalt as an even better source for your BHC needs. From the new Calvert City, Kentucky plant, Pennsalt, the pioneer manufacturer of high gamma BHC, can supply you with 46% High Gamma Technical.

High Gamma content enables production of more highly concentrated dust bases, wettable powders or liquid formulations. Penco High Gamma BHC can be melted and impregnated for the production of quality cotton dusts; or

easily dissolved in common solvents to produce superior formulations at lower costs.

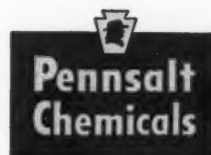
Penco BHC Technical containing 14% gamma is now also available from Pennsalt in flake form, for those who wish merely to grind and extend it into dust bases or finished cotton dusts.

For superior products of dependably high quality, backed by continuous research, choose the Penco Brand.

Write to the office nearest you for technical assistance, or ask for the new technical bulletin on Penco® BHC Products.

**AGRICULTURAL CHEMICALS**  
**Pennsylvania Salt Manufacturing Company of Washington**

Tacoma 1, Washington • Philadelphia 7, Pennsylvania  
 Montgomery, Alabama • Bryan, Texas • Portland, Oregon  
 Los Angeles and Berkeley, California



Library  
University Farm  
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PS4E

## phosphate

For the manufacture of  
complete fertilizers.

## phosphate

For the manufacture of  
industrial chemicals.

## phosphate

Ground rock phosphate  
for direct application  
to the soil.

## phosphate

Defluorinated phosphates  
for feed and mineral  
manufacturers.



**International phosphates for industry and agriculture**

phosphate division

**INTERNATIONAL MINERALS  
& CHEMICAL CORPORATION**

General Offices: 20 North Wacker Drive, Chicago 6

*Phosphate Mines and Plants in Florida at Noralyn,  
Bonnie, Peace Valley, Achan, Mulberry; in  
Tennessee at Mt. Pleasant and Wales; in Missis-  
sippi at Tupelo.*

